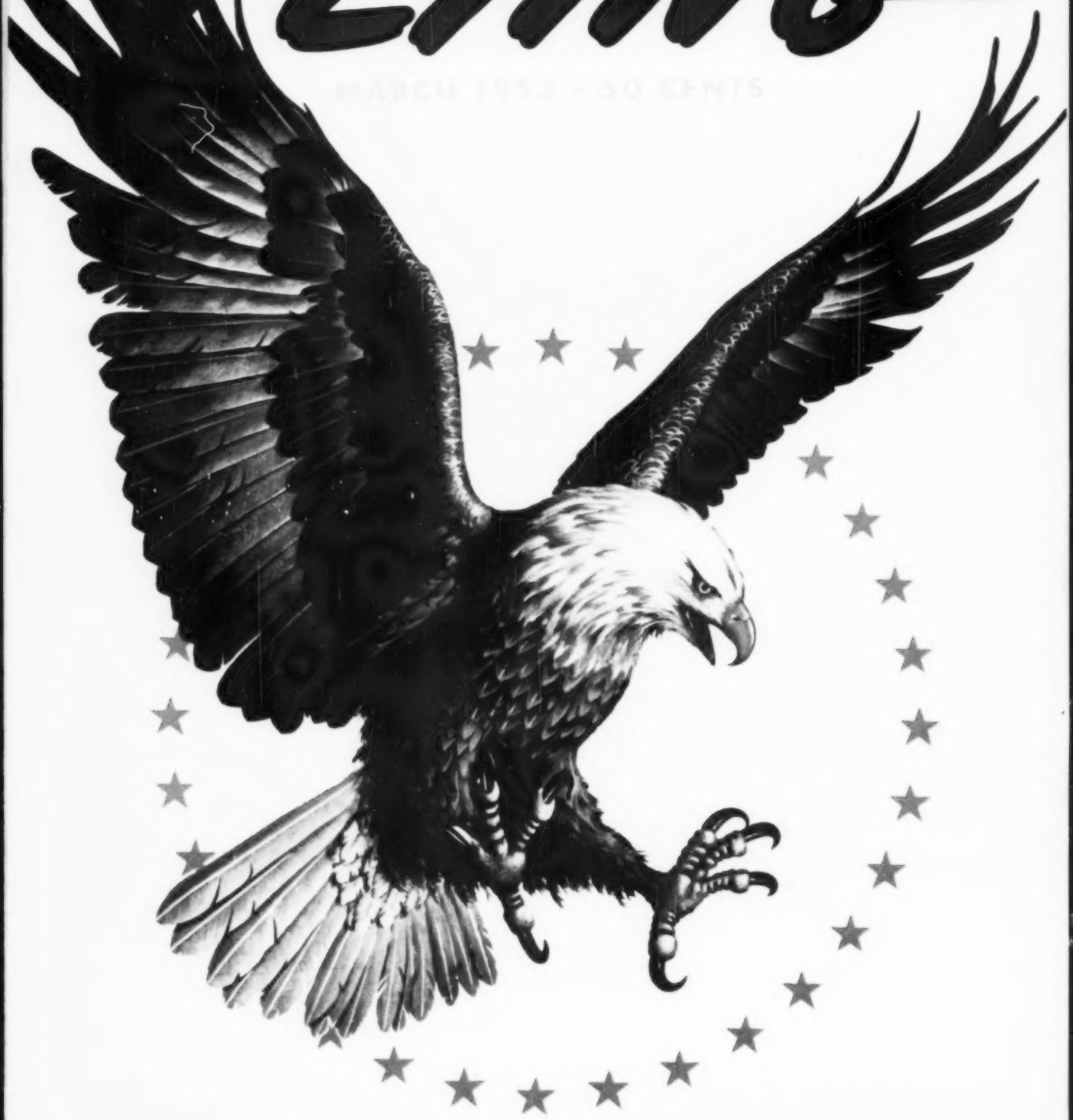
SPECIAL DEFENSE ISSUE

FLYING



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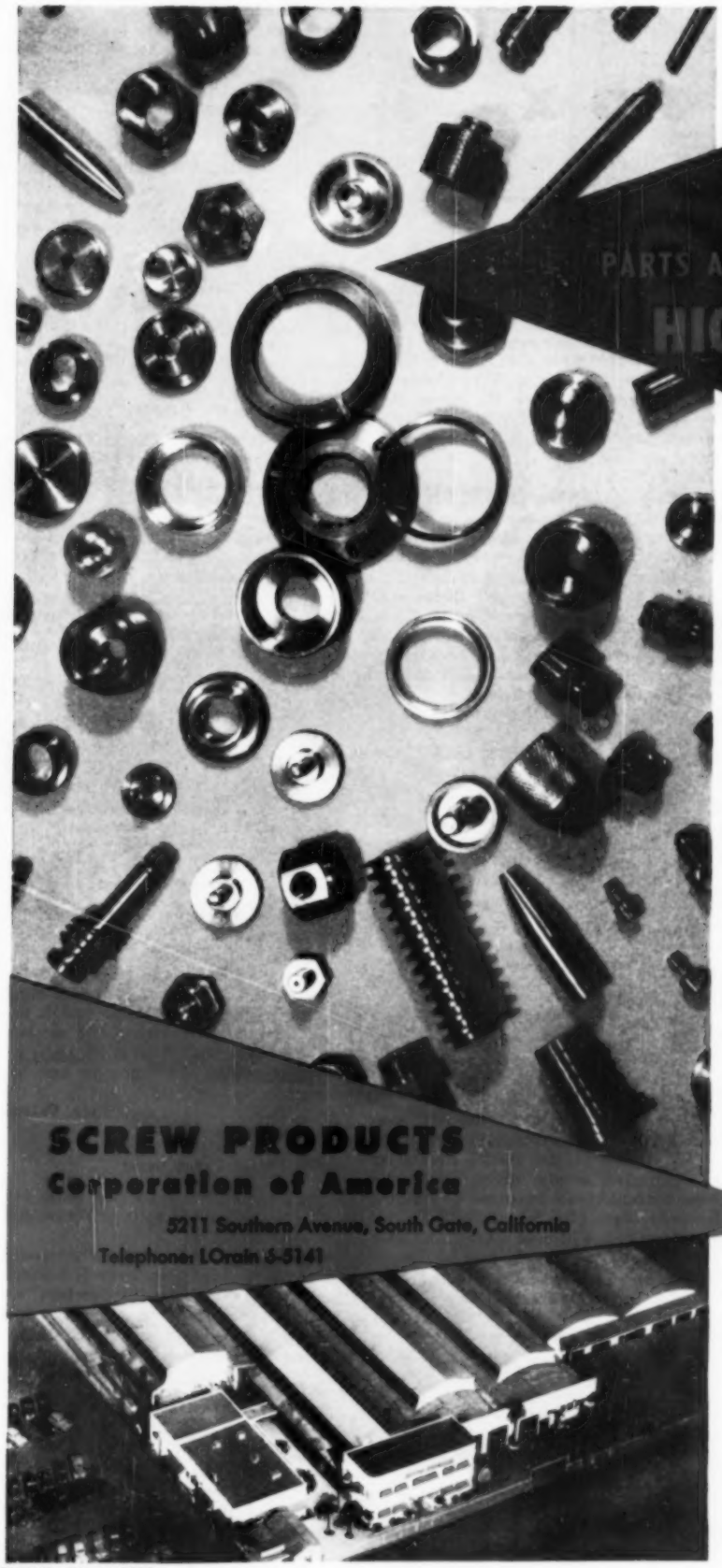

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PLANNING POSTSCRIPTS

I enjoyed "Plan for Pleasure" (FLYING, January). That picture of Bad Lands reminded me of the country west of Albuquerque, N. M.

With a friend as co-pilot, I flew a Waco UPF 7 (open cockpit) from Rochester, N. Y., to Oakland, Calif., and back in two weeks in 1950.

Over those Bad Lands about 2 one afternoon we found a thunderstorm in our path along the highway. A tip from a previous magazine article on gunsight navigation came in handy. By swinging 30° off course to the left and flying for seven minutes, we could swing back 30° to parallel our proper course alongside the storm, and soon swing another 30° to the right which in a few minutes brought the highway in sight.

Between Amarillo and Albuquerque, as we pushed along with full throttle to keep a decent height above the 6,000-7,000′ country getting higher very gradually, I was disturbed to feel or imagine a little roughness in the 220 Continental. A mechanic at Albuquerque checked and advised me to use carburetor heat when flying up where the clouds form. It worked fine the rest of the trip. Also leaned out the mixture when above 6,000′.

In spite of reading emphatic advice to make fast wheel landings at high altitudes, I was timid about the Waco bouncing in my wheel landings. So, at Winslow, Ariz., and Battle Mountain, Nev., my stall landings were nicely fouled up in the thin air by tricky cross-gusts. No matter how you hate those fast wheel landings, you must grit your teeth and set her down even at 100 mph groundspeed on the high airports.

And why didn't someone warn us about full load at those high airports on hot summer days? Fifty gallons of gas in the Waco weighs quite a bit. It should be cut 50 or 100 lbs. for take-off and climb out of airports such as Flagstaff, Ariz. (7,500′) and Gallup, N. M., on a hot afternoon. We got off the runway OK but at 100-200′ above it we stopped climbing and just mushed around trying different mixture settings and carb heat. After a few minutes we got some climb and were on our way very glad for an end to hanging close to the tree tops.

I especially endorse that tip of marking the radio frequencies on the chart so you can read them in flight. By the way, does everyone know about the Aero. Planning Chart of the U. S. (AP 9) on which the flight should be marked in order to see which Sectionals will be needed? Perhaps one of the flight charts such as Boston to Chicago (FC 228) would bracket the entire route. Can be ordered from Coast and Geodetic Survey, Washington 25, D. C. AP 9 is 40 cents, FC 228 is 25 cents.

HAL BILLS

Rochester, N. Y.

FASTER AND FARTHER

The December issue of FLYING was RED HOT. Such features as Max Conrad's Log, Old Enough to Vote, He Buzzes Belugas, The Detroit Story, Escape From Earth, just to mention a few, really scored with me.

Tonight I wish I could have planned and carried out an Escape from Nebraska yesterday in my Luscombe 8A as we are in the middle of a genuine midwestern blizzard. Which gets me around to another thing—airplane operating costs.

I find that my 8A travels faster and farther on a gallon of fuel than an automobile will, by a considerable margin. No traffic problem—don't have to wonder whether I'll make it around that big diesel truck or not—and it doesn't need a new set of four tires every 15,000 or so miles either.

KEITH W. WICKETT

Belden, Nebraska

AERONCA MEMORIES

Congratulations on "Old Enough to Vote" (FLYING, December). To many of us then, and even now, the early Aeronca C-3 was the very acme of ultra light, slow speed sport flying. I was just a kid then, but the greatest thrill of my life was my first ride in an airplane.

I guess there must be a certain segment of us today who even after flying the modern lightplanes (that are no longer truly light) yearn for the sheer exhilaration of just puttering along in the old wire-braced C-3, with plenty of wind, noise and that wonderful feeling that we were practically a bird.

I've often wondered if we will soon have a return to the ultralight sport plane trend similar to the recent revival of wire-wheeled, windy, noisy, dusty and even uncomfortable imported sports cars. It would be great fun, wouldn't it? Private aviation needs a little of what it had back then—a real desire to fly just for fun; to spend an afternoon rattling around the landscape in a simple ship like the C-3, not caring whether we had a two-way radio, flaps or even an airspeed indicator.

We plan to settle on a farm in Virginia next year. I'll have plenty of time then and if I can locate an open-sided C-3 in reasonable shape I sincerely believe I'll buy it and share a little of that fun Peter Bowers has been having.

ROBERT A. JONES

Aiken, South Carolina

The article regarding the Aeronca C-3 brings back many memories of aircraft development in the late 20's and early 30's. The question as to what has happened to all the Travel Airs, Fleets, Swallows, Great Lakes, Wacos, Spartans, Murphys etc. prompts this letter.

I, for one, would greatly appreciate some articles about the above-mentioned airplanes and I am sure that most fliers and aviation enthusiasts between the ages of 30 and 60 would feel the same.

M. C. POWELL

Perris, California

● FLYING's *staff got a kick out of "Old Enough to Vote," too. The first across-the-country flight of one of the editors was made in a C-3. We'll make a project of uncovering more good stories on the fondly recalled oldtimers.*—ED.

ON, ILLINOIS!

A fine report on "Flying Professors" (FLYING, January). I learned to fly at the University of Illinois as a student in their flight program and have since worked two summers on their line crew. They have a superb organization that is an excellent example for other institutions to follow. Who says professors are stuffy old stick-in-the-muds?

ROBERT W. LOCKLIN

Urbana, Illinois

Clifton Trio

EXPERIMENTAL TRIO

Enclosed is a picture of the Clifton *Trio*, an experimental aircraft built by Fred, Jene and Jack Clifton. The wingspan is 22′; length 16′; weight empty, 620 lbs.; cruising speed, 125 mph; rate of climb, 1,000 fpm; engine, 65 Continental. It took eight months to complete the airplane. The *Trio* was built from spare parts and salvaged tubing, according to our own design.

JACK CLIFTON

La Junta, Colo.

BEAU GESTE

I want to let you know how much I enjoyed the December issue of FLYING from cover to cover.

"Max Conrad's Log" is an interesting presentation and "Polo Defends America" and "Air Conditioning the Teachers" will be hailed in the CAP field. These worthy articles should be of much help to us in getting out the total CAP story.

I think you will be interested to learn that we have offered our national services to Jimmie Doolittle and Aircraft Industries Association in putting over Wright Memorial Year.

MAJ. GEN. LUCAS V. BEAU, USAF
National Commander,
Civil Air Patrol
Washington, D. C.

(Continued on page 133)

FLYING OFFICE—Top companies keep pace with modern business in Executive model Convairs

FLYING HOSPITAL—Convair's flying Samaritan speeds medical care and comfort for the armed forces

—Convair gives wings to people on the *GO*—

FLYING CLASSROOM—Air Force navigator-bombardiers are trained in flight with Convair T-29's

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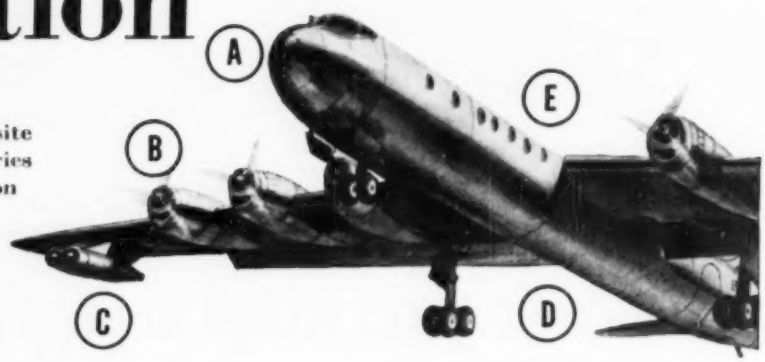
The airplane illustrated is a composite since, obviously, no single plane carries all of the Bendix equipment listed on this page. However, many Bendix products fly with every U. S. fighting plane and are used extensively on commercial, executive and private planes as well.



a

- Radio Noise Filters
- Switches
- Flow Equalizers
- Vacuum Operated Instruments
- Filters for Aircraft Heaters (Auxiliary, Engine, Cabin)
- Pneumatic System Filters
- Dynamotors
- Blower Motors
- Band-Change Motors
- Booster Dynamotors
- Actuator Motors
- Special Inverters
- Aircraft Interphone Systems
- Radar
- Radio Transmitters
- Radio Receivers
- Radio Communication Systems
- Electronic Navigational Equipment
- Automatic Radio Compass
- VHF Omni-Directional Range Equipment
- Automatic Pilot and Flight Path Control Equipment
- Autosyn* and Magnesyn* Remote Indicating Systems For
  - Fuel Flow • Fuel Pressure • Hydraulic Pressure • Liquid Level • Manifold Pressure • Oil Pressure • Position • Temperature • Torque Pressure • Water Pressure
- Fuel Flow Totalizing Systems
- Manifold Pressure Gauges
- Electric Tachometer Systems
- Warning Units
- Accelerometers
- Airspeed Indicators
- Attitude Horizon Indicators
- Driftmeters
- Dual Radio and Magnetic Compass Indicators
- Gyro Flux Gate* Compasses
- Gyro Horizon Indicators
- Magnetic Compasses
- Rate of Climb Indicators
- Turn and Bank Indicators
- ODR Components
- Sextants
- Control Panels

b

- Bendix* Starter Drives
- Magnetos
- Ignition Harnesses
- Booster Coils
- Igniter Plugs
- Ignition Analyzer
- Low and High Tension Ignition Systems for Reciprocating Engines
- Radio Shielding Harnesses
- Hydraulic—Line Type Filters
- Reservoir—Line Type Filters
- Vent—Line Type Filters
- Fuel System Filters
- De-Icing System Filters
- Alternators
- Fault Protection Systems
- Generators
- Inverters
- Line Relays
- Overvoltage Protectors
- Reverse Current Cutouts
- Voltage Booster Dynamotors
- Voltage Regulators
- Power Failure Indicators
- Engine Starting Equipment, including
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- Automatic Engine Power Controls
- Automatic Engine Boost Controls
- Propeller Governor Controls
- Supercharger Regulator Controls
- Injection and float type carburetors
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- Speed-Density Fuel Metering Systems for Jet and Reciprocating Engines
- Water Injection Systems

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c

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- Duplex Nozzles
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d

- Brake Lining
- Hydraulic Actuating Cylinders
- Power Brake Valves
- Shock Absorbing Struts
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- Wheels
- Master Cylinders
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e

- Electrical Connectors
- Small Electric Actuators
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- Hydraulic Accumulators
- Hydraulic Hand Pumps
- Position Light Flashers
- Pressure Control Valves
- Electric Timing Devices
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additional aviation products

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Bendix in the weather field

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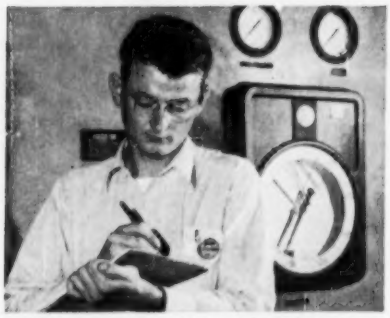
Another NORTHROP Graduate Chooses Jet Engine Career



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RED HOT NEWS

(Ed. note—Data here presented comes from patriots behind the Curtain. They know aviation and are reliable. However, they work under great stress, and possibility of error must always be considered. Data is original. Some items must be withheld for pertinent reasons.)

GUIDED MISSILES

A 750-foot long guidable missile about four feet in diameter has been reported by several East German observers. The missile is designed to be launched from an inclined platform by a liquid rocket booster that is said to accelerate the huge assembly until cruising speed of about Mach 3 is reached. At that speed the rocket booster drops off and the main motor, a huge ram jet, cuts in. Compression ratio of the ram jet is reputed to be 30 to 1 and the heat release—60,000,000 BTU/hour/cu.ft. (About 25 times the amount of heat generated by an average blast furnace.) Another report has it that the experimental model of the ram-missile was destroyed on a trial flight when its parachute mechanism failed to open.

NEUROTIC U.S.A.F.

On November 11, 1952, Polish Radio Warsaw broadcast a special report from the Korean front. Speaking of the "capitalist forces" in derogatory adjectives, the author of the report solved the global problem of the third world war by discounting the U.S.A.F. as "a bunch of neurosis-ridden youngsters." Referring to an article in Collier's, the author of the Red propaganda informed the listeners of the "mental hospitals in America being packed with Korean front runaway pilots, which is probably the reason why the victorious North Korean flyers equipped with magnificent aircraft vainly patrol the skies over the front line. . . ."

PORTABLE SUBS

During recent maneuvers in North West Russia, 150 bantam submarines of *Malutka* class have been hauled out of the sea in Leningrad and shipped by truck rail and transport planes to Odessa, a distance of over 1,000 miles. The re-assembly and launching of the midget sub fleet was accomplished in 13 days. *Malutka* class displaces about 200 tons on the surface, is 147 feet long, carries one 45mm gun, one machine gun and two 21" torpedoes. Speed: 15 knots on the surface and 10 knots submerged. It is believed that the first shipment of those subs was made last summer, when a number of them were transported from East German locations to a reputed secret Russian stronghold on Saseno, a small island off the Albanian Coast.

RED JANISSARIES

Czechoslovak and Polish sources now report cradle-snatching methods used by the Reds in satellite lands to secure future members of the Red Air Force. One or both parents of non-communist families with young offspring are arrested on phony charges. Meanwhile, their children are taken to state orphanages where their training begins. Practiced for some time in Soviet Russia proper, this form of press-gang recruiting gave Russia a cadre of most ardent communists. The future *Janissaries* of the Red Air Force begin their aviation indoctrination together with ideological indoctrination in elementary schools. Through forceful suggestive techniques, they are taught that their "machines are not expendable—the pilots are"; "Russian engineering genius provided you with airplanes far superior to those you may encounter in the future war"; "your machines will never fail you."

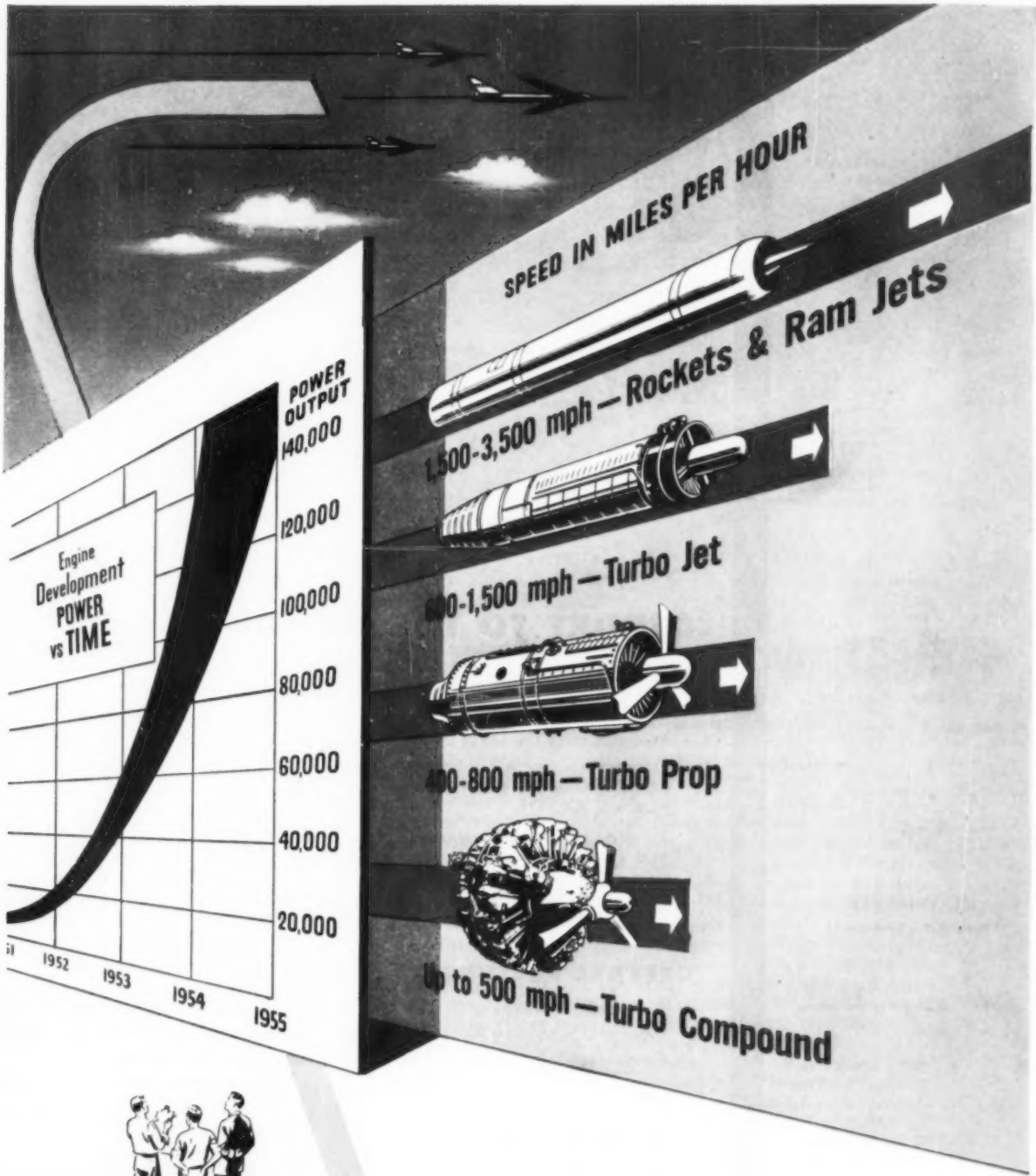
These excerpts, and similar propaganda, make up lectures given from the time the captive children are first shown a paper kite. The flyers so brought up are capable even of suicidal missions as was demonstrated in the last war. During high school and flying training, the students live in strict discipline. No passes are allowed; the food is plentiful but simple. According to a Russian pilot officer, they are given a daily dose of saltpeter and baking soda that supposedly act as anaphrodisiacs to "conserve the sex energy for flying."

Although contact with the students is impossible, enough of the graduates are stationed in East Germany and Poland to enable the observers to piece together the following information.

These "super flyers" are planted in every unit of the Red Air Force. They lead in flying and ground performance of duty. They regard women as necessary evil, never marry, abstain from alcohol and do not participate in social activities. Their spare time is devoted to self improvement in gunnery, flight, maintenance and airmanship. The exact number of them is not known, but most of the units stationed in Poland and East Germany are reported to have at least three graduates of the military orphanages holding ranks from cadet to captain.

NUCLEAR ENERGY

Soviet prospectors are said to have discovered low percentage uranium ore in Poland. Seven mines are already in operation and the annual output of ore is calculated at 200,000 tons.



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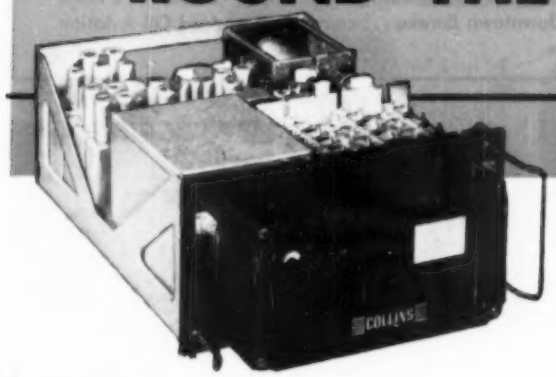
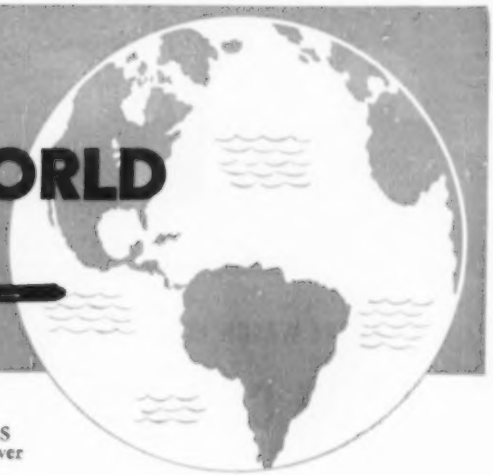
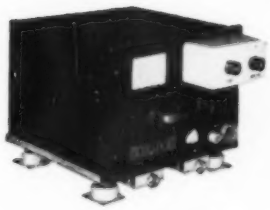
a voice to be heard 'ROUND THE WORLD



Collins 618S
HF Transceiver



the NEW Collins 618S 144 Channel HF Transceiver



Collins 180L-2
Antenna Tuning Unit
(Also used with
Collins ART-13 and 18S)

SPECIFICATIONS

SIZE:
1½ ATR TRANSCEIVER

WEIGHT:
Approximately 75 pounds, which includes both Transceiver and Power Supply.

TUNING:
Internal circuits automatically tuned after insertion of crystal.

POWER OUTPUT:
100 watts phone and CW.

INPUT VOLTAGE:
28 volts DC and 400 cycle, 115 volts AC.

Up To 144 Channels — 2 to 25 megacycles

100 Watt Power Automatic Operation

The Collins Radio Company takes pride in announcing the 618S HF Transceiver as a long awaited successor for overseas operations to the Collins 18S Transceiver now being used everywhere in the air. The 618S is designed primarily to meet the requirements of the many commercial airlines engaged in interchange agreements and international operations. Its 100 watt power is proven completely adequate for domestic and overseas operations.

The 180L-2 antenna tuning unit matches the output of the 618S to standard aircraft antennas and guarantees peak performance on ALL frequencies under ALL operating conditions. Another advanced design feature is the use of the Collins mechanical filter in the IF circuit which provides maximum adjacent channel rejection.

Every engineering effort has been directed toward insuring the utmost in dependability, ease of maintenance, and the elimination of ground adjustments formerly necessary to implement a frequency. No coil changing — no tune-up required — modular type construction is used, and the units are plug-in type for ease of servicing and maintenance.

First airborne Transceiver to use mechanical filters • Write Today for Complete Details

For Engineering Excellence in Airborne Communications, it's . . .

COLLINS

COLLINS RADIO COMPANY, Cedar Rapids 1, Iowa

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PLANE FAX

Quick picture of

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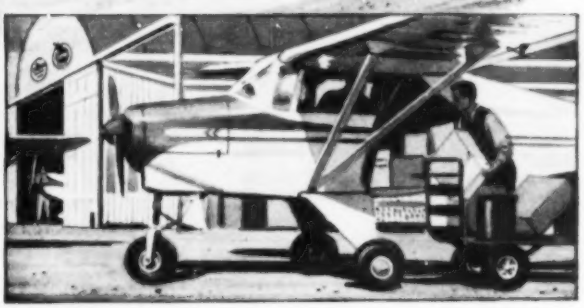
A FIRE WATCH FLYER SAYS:

You can get longer engine life

Paul E. Fleming, of Fleming's Flying Service at Eureka, flies regularly for the U. S. Forest Service. Here's what he says about making your engine serve better for more flying hours:

"We do a lot of mountain flying with heavy loads and small field take-offs—tough conditions for any engine. However, our planes often go from 1100 to 1400 hours before major overhaul. We believe the reason is simple—we use RPM Aviation Oil exclusively in our light plane engines, and the record on the 50-odd planes based here shows that 'RPM' definitely keeps rings free, holds valve wear down and keeps our engines clean.

"Take-off power is a must in mountain flying—and we find that we really get it with Chevron 80/87 Aviation Gasoline.



Important safety factors, too, are the way Chevron 80/87 ends take-off knocking and pre-ignition. We don't get rough running—and Chevron 80/87 definitely keeps our engines cleaner than other aviation fuels. That's why we recommend Chevron 80/87 and RPM Aviation Oil as your two best buys for better all-round performance and longer engine life."

T.M.'S "RPM", "CHEVRON," REG. U.S. PAT. OFF.

TIP OF THE MONTH

Paul Fleming says: "When you have to land in a small field it's safer to make a power-on approach. This will give you a lower approach speed and better control."

CHEVRON AVIATION GASOLINE

RPM AVIATION OIL

STANDARD OIL COMPANY OF CALIFORNIA

It takes more than planes...

To win the war in Korea takes more than jets and jeeps, bullets and brains, cartridges and courage...

G.I.'s at the fighting front, the blue jacketed men on battleships, the pilots of planes... the vital administrative services abroad and at home... need thousands of products for their safety and security, comfort and convenience. The civilian is seldom conscious of the vast range of military supplies.

At General Aniline & Film, we are privileged to make and supply some of the indispensable items.

GAF's dyestuff division manufactures the dyestuffs for uniforms, cartridge belts, tents, socks, underwear, caps, sheets... "blues" for gobs... colors for all services ... and for the living symbol, the flag.

Because they work best, the GAF detergents are used at sea by the Navy to launder with salt water, and reduce requirements of fresh water on ships.

GAF carbonyl iron powder is vital in radar, sonar, short wave radios, phones, hundreds of types of electronic devices.

The GAF Ansco division supplies superior X-ray film for service hospitals, makes the cameras and films for aerial photography, and complex precision instruments for the services.

The Ozalid division produces the Ozalid facsimile reproducing machines used on ships and in the War and Navy departments, for rapid duplication of orders, reports, and messages.

And GAF research has contributed PVP for the civilian defense... synthetic blood plasma that could save thousands of lives in an atomic bomb attack.

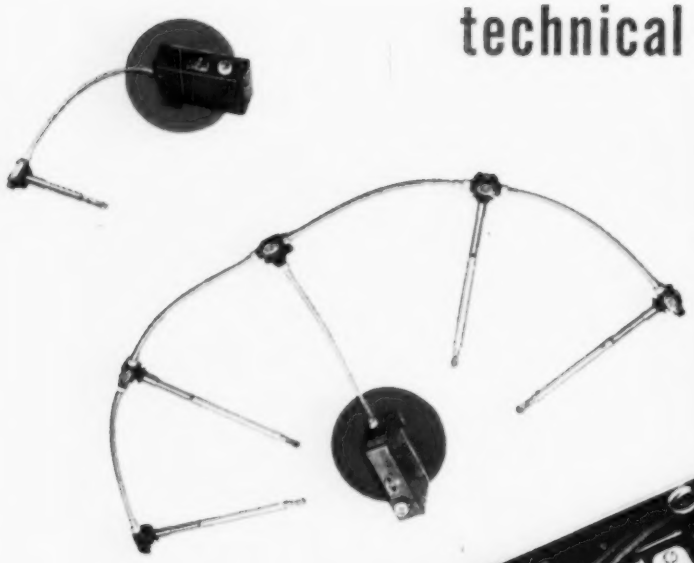
GENERAL ANILINE & FILM, the largest domestic manufacturer of high quality dyes (sold by General Dyestuff Corp.) ... has two huge plants at Grasselli, N. J. and Rensselaer, N. Y. The Ansco division with plants at Binghamton, N.Y. is the nation's second largest supplier of cameras, photographic films, and paper. And the Ozalid division, at Johnson City, N. Y. makes the Ozalid® reproducing machines and sensitized paper. All GAF facilities supply products vital to national defense... and to maintain peacetime living standards.

GAF is a good company to work for and with, worth knowing and watching.

General Aniline & Film Corporation

From Research to Reality... 230 Park Avenue, New York 17, New York

technical bulletin by EEMCO



UNIVERSAL POWER PACKAGE HAS MANY APPLICATIONS

TECHNICAL DATA

Weight, complete — 3⅜ lbs.

Dimensions — 7⅛" x 4 7/16" x 2¾"

Operates in ambient temperatures up to 250° F.

Conforms to AN-M-40 and latest MIL. specs.

EEMCO helps you build for the future

Completely self-contained . . . This rotary actuator package, designed and built by EEMCO, combines the following elements in an integral metal container: Motor . . . radio noise filter . . . magnetic clutch and brake . . . main gear reduction driving power take-off for operating aileron and elevator trim tabs. Auxiliary gearing operating adjustable limit switches to control travel, light switches and position indicator.

Versatile . . . A few of the many possible power unit screw jack combinations are illustrated. It can also serve to drive rotary or linear type actuators through a flexible shaft in difficult installations where space will not permit complete linear or rotary actuator units.

Variable power and speed . . . Changes in motor winding, lamination stack length and gear ratios permit a wide variation in power and speed without modification of the package. Variations in positioning and indicating are possible by change of gear ratios in auxiliary gear box.

Mounting bracket and AN receptacle can be located in various positions on the container to provide additional flexibility.

ELECTRICAL ENGINEERING AND MANUFACTURING CORP.

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Now More Than Ever the Outstanding Aviation Value!

The New 1953 PIPER TRI-PACER

With SAFETY PROVEN TRICYCLE GEAR and SIMPLIFIED CONTROLS

There is no question of the preference for tricycle gear. Every modern airliner, every new jet has this modern gear. Only Piper offers it in the medium-priced field. With exclusive Hydrasorb shock absorbing system, the new 1953 Tri-Pacer takes the skill out of landings and take-offs. And the exclusive inter-connected controls mean even greater flying ease. Just steer it with wheel alone like your car. For special purpose flying, Piper also offers the Pacer with three-point gear.

Well over two-mile-a-minute cruising speed, tricycle landing gear for safer, easier landings, remarkable load-carrying ability—and operating costs far lower than for any other four-place plane. That's what you get in the new 1953 Piper Tri-Pacer—the best combination of the four things you want most in your own airplane—performance, safety, utility and economy.

Be sure to see and fly the new beautiful 1953 Tri-Pacer at your Piper distributor's now. The snappy performance, the flying ease, the cabin comfort, and the restful quiet will prove to you that, once again, Piper has set the pace in business airplane development. Here are just a few reasons why:

MORE ROOM and COMFORT and SENSATIONALLY QUIET. More length, more width give lots of room for four large passengers. New, quiet-sealed windows, plus added sound-proofing give really quiet flight. New, handsome two-tone styling sets the pace in beautiful interiors, too!

MORE BAGGAGE SPACE. There's room for all the baggage shown below in the greatly enlarged baggage compartment loaded through new, large outside door. Spacious hat shelf behind rear seat is another fine new feature.

NEW BEAUTY and STYLING. New two-tone paint design in optional colors gives the new 1953 Tri-Pacer a smart, distinguished appearance you can't beat for beauty.

135 HORSEPOWER. Finest engine ever developed for business flying—that's the verdict you get everywhere on the superbly smooth Lycoming engine. Rated at 135 horsepower, the dependable Lycoming is one reason why the Tri-Pacer is far more economical to operate than any comparable plane.

FREE—this brand-new full-color brochure on the Tri-Pacer and Pacer with three-point gear. Send today for your copy.

PIPER AIRCRAFT CORPORATION, DEPT. 12-G
Lock Haven, Pa.

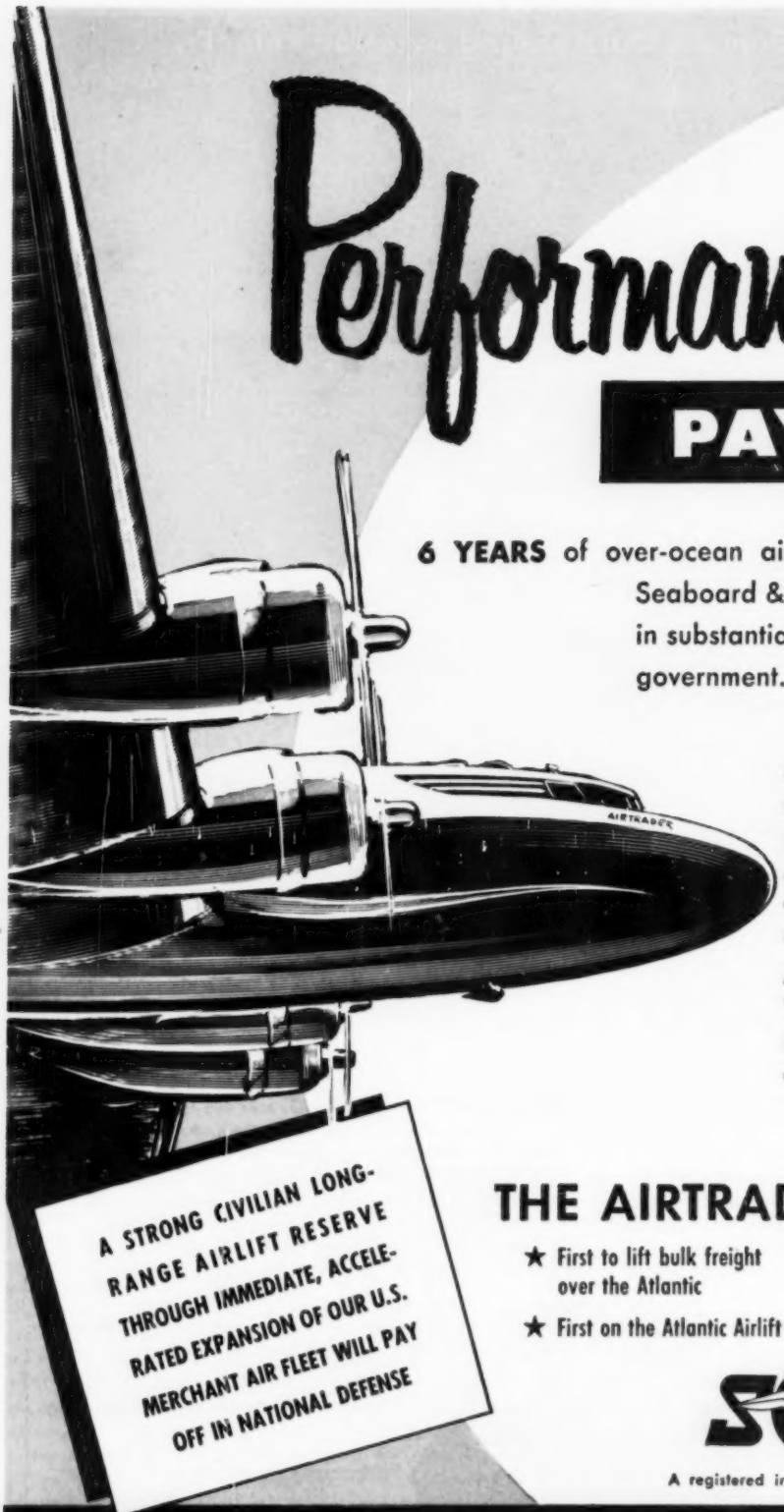
I am interested in a plane for ☐ business ☐ farm ☐ personal use. Please send the new brochure on the 1953 Tri-Pacer and Pacer.

Name_____

Address_____

City_____ State_____

More People Have Bought Pipers Than Any Other Plane in the World.



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6 YEARS of over-ocean airlift of bulk commodities by Seaboard & Western Airlines has paid off in substantial savings to both industry and government.

Seaboard's Airtraders have flown more than 20,000,000 revenue miles—in 3,600 crossings of the Atlantic and Pacific for commercial, military and civilian government agencies.

Make this know-how pay off for YOU with *reduced* in-transit times, insurance costs and trans-shipping charges by using . . .

A STRONG CIVILIAN LONG-RANGE AIRLIFT RESERVE THROUGH IMMEDIATE, ACCELERATED EXPANSION OF OUR U.S. MERCHANT AIR FLEET WILL PAY OFF IN NATIONAL DEFENSE

THE AIRTRADER SERVICE

- ★ First to lift bulk freight over the Atlantic
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WORLD'S LARGEST PRODUCER OF READY-TO-INSTALL POWER PACKAGES FOR AIRPLANES

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LEADERS OF INDUSTRY

Know the Value of Time

These three men are symbolic of America's interdependence in producing better, and more dependable means of assuring the defense of our country. ¶ Their contributions to the aircraft industry and the air arm of our nation have been achieved through constant regard for scientific demands . . . mechanical requirements and the vital element of *time*. ¶ It is for the safeguarding of such men's time and yours, that Rolex precision Chronometers are made available by leading jewelers throughout the United States.

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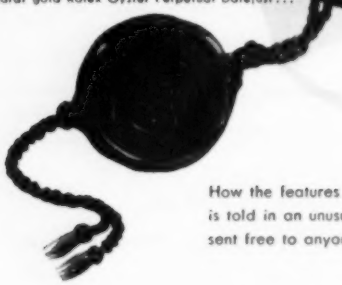
The Rolex Red Seal is your guarantee of accuracy . . . it shows that the Swiss Government has awarded this Chronometer an official timing certificate. Worn but six hours a day it never needs winding. Its astonishingly accurate movement is completely protected from water, dust and perspiration . . . by the famous imported Super Oyster Case. Rolex Swiss Officially Certified Chronometers from $145 to $1000.

The 18 carat gold Rolex Oyster Perpetual Datejust . . . with 18 carat gold matching bracelet.....$1000



How the features of this remarkable timepiece were developed . . . is told in an unusual bochure entitled "BLUEPRINT OF SUPREMACY", sent free to anyone requesting it on business or personal stationery.

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Swiss Officially Certified Wrist-Chronometers

THE AMERICAN ROLEX WATCH CORPORATION • 580 FIFTH AVENUE • NEW YORK 19, N. Y.

Northrop's Prime Equation

Northrop *boundary-layer scientists,* like the man above, are concerned with complex problems aimed at achieving the maximum efficiency in aerodynamic surfaces at high speed.

Equations are used to solve problems. At Northrop Aircraft, the prime equation combines teams of administrators, outstanding scientists and production specialists with modern industrial and research facilities. The combination efficiently converts imagination and knowledge into actual matériel of advanced design and incalculable value.

As a member of the U. S. defense team, Northrop Aircraft provides Talents—scientific, engineering, administrative, and production; Facilities—research and manufacturing; and Products—aircraft, target aircraft, missiles, optical devices, and many more.

NORTHROP AIRCRAFT, INC.
HAWTHORNE, CALIFORNIA

Pioneer Builders of Night and All Weather Fighters

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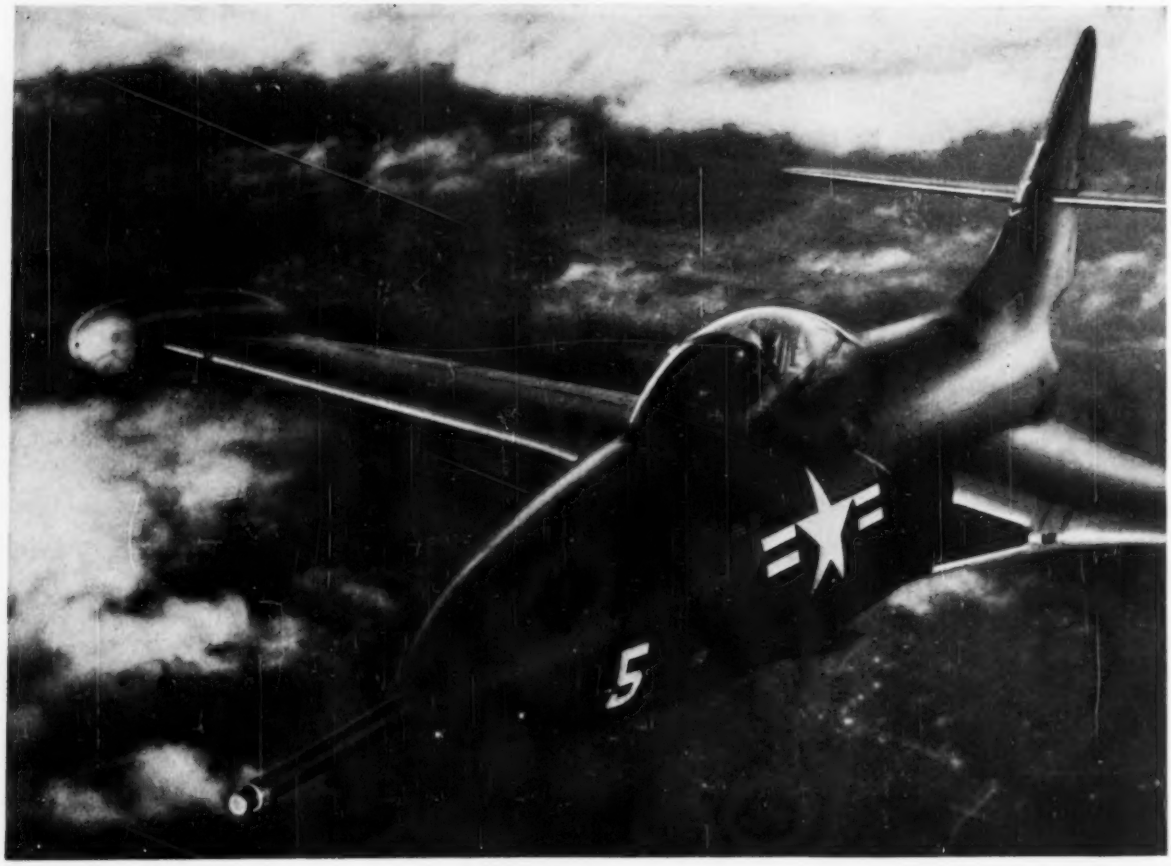

LONGER LEGS FOR NAVY PANTHERS

The pipe-like extension on the nose of this GRUMMAN PANTHER is part of newly developed in-flight refueling equipment that greatly extends the range of these hard-working Navy and Marine Corps jets. On the job in Korea since the start of the conflict, PANTHERS have been frequently employed on such missions as protection of slower flying bombers and attack planes, flak-suppression and MIG-extinction.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION, BETHPAGE, LONG ISLAND, N. Y.

Contractors to the Armed Forces

TYPICAL FLAGSHIP SAVINGS*

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YOU SAVE	$6.07	$5.01	$4.82
YOU SAVE	6½ hrs.	12½ hrs.	13½ hrs.

*Comparison with Standard Fare Train (including lower berth)

Unless you've got money to burn!

No expense-conscious traveler can afford to overlook the economy chart above. It shows examples of how much time and money (in fares alone) Flagship travel saves you compared to first class surface transportation. In addition, there are other savings such as the delicious Flagship meals served without cost. Isn't it plain that Flagship travel, long your greatest *time-saver*, is now also your *best travel buy?*

America's Leading Airline **AMERICAN AIRLINES INC.**

FLYING's

REPORT TO THE NATION

AIR FORCE ★ ARMY

NAVY ★ MARINES

All hands . . . one cause

AN EDITORIAL

FLYING, with the largest readership of any aviation magazine in the world, has a special responsibility for broadening the base of public aviation consciousness.

Part of this responsibility lies in the field of national security where military aviation functions. As a matter of fact, the sum total of aviation assumes military value in time of crisis.

We believe therefore that as grows the aviation consciousness of the American public so will grow the security of the United States.

But even airpower cannot be seen in true perspective except in its relation to other security forces. Nothing that is truly great stands remote or alone.

Those who over the years have inveighed against an independent voice for airpower today stand refuted by experience. But likewise refuted are those who in espousing the cause of airpower feel it necessary to exclude all else.

Airpower needs no advocacy beyond a dispassionate appraisal of its partnership status in relation to total security.

It is in the spirit of this fact that this issue of FLYING Magazine has been compiled. It was in this spirit that each of the armed services . . . Army, Navy, Air Force and Marines . . . appointed a project team to assist the editors with data, statistics, and photographs.

With this thought as a background the editors then assigned members of the staff to present the unique viewpoint of each service as faithfully as lay in their power. We wanted contrasts and shadows to stand forth as clearly as the sunshine of agreement. Unification must never be a saboteur of honest rivalry and intellectual integrity. Airpower itself could least afford any curb of initiative and intra-service morale.

Thoughtful reading of the text of the four main reports presented in the magazine will reveal how vastly aviation utility has penetrated the operations of all combat services. In Navy the aircraft carrier is seen to team up with the battleship as capital power. In Army the aircraft as a troop carrier or an organic "jeep" has revolutionized all former concepts of mobility and flexibility. For the Marines the helicopter is promising fresh beachhead techniques. And in the matter of defense logistics military air transport for critical supply has become imperative.

Another broad fact seen to stand out in the mission of each service is the global nature of its operation . . . a condition fostered by the advent of flight. Shrinking of travel time between distant points has expanded the amount of training necessary for operations in divergent areas . . . arctic, tropics, deserts, mountains. Thus aviation has forced a higher degree of specialization and a requirement for expanded skills not only in the Air Force itself but in sister services as well.

A third vivid reflection concerns the vast industrial effort which lies behind national security in the air age. Modern airpower in its manifold adaptations has made necessary an industrial coordination far beyond anything required in the last world war. Many manufacturers of component parts today are doing a greater volume of business than were prime contractors of a decade ago. This being the case it is imperative that manpower and especially skilled manpower be conserved. Masses of troops must be supplanted by massed firepower in the hands of comparatively few personnel.

No free man can know what is in the mind of an aggressor or upon what basis he may decide to move into full military attack. What we can know is that security is for the strong and that strength in this day derives largely from the adaptation of aviation to the sum total of defense forces.

The integrity of an independent Air Force must be maintained as the taproot of airpower and from it must come well-reasoned concepts of air strategy and a steady flow of creative development. Beyond that point, the more organic use of the airplane made by others the better for the security of the free world.

There are no headlines to be gained in the appeal to reason—but in reason lies the way of security and peace. To that objective the editors dedicate the subject matter between these covers.

Gill Robb Wilson

Gill Robb Wilson
Editor and Publisher

COMMANDER IN CHIEF

GENERAL HOYT S. VANDENBERG
Chief of Staff, United States Air Force

Shortly after World War II the Soviet Union began building a long-range air force. That force, now numbering many hundred aircraft of B-29 type, is capable of carrying atomic bombs from the growing Soviet stockpile on one-way flights to targets anywhere in the United States. Early in this same period, the Soviets seized the opportunity provided by the development of the jet engine to cancel our advantage in World War II piston-driven aircraft by building large numbers of jet fighters like the MIG-15. At present they are modernizing their air force rapidly toward the end that practically all the 20,000 aircraft in their combat units will be jet propelled.

To offset this growing Soviet air strength the United States Air Force is now building toward 143 modern wings. With this 143-wing force flying the finest aircraft and manned by highly trained officers and airmen the Air Force believes it can prevent a general war by holding over the would-be aggressor the threat of an atomic air counterattack against the vital sources of his war-making strength. Should the Soviet Union disregard the consequences of its actions and attack the United States, the 143 wing force is organized and equipped to undertake the task of averting defeat at the war's outset, damaging the enemy profoundly, and perhaps mortally, and preserving sufficient of our industrial and military resources to enable us to recover our strength and fight to victory.

Thus peace, and possibly national survival, depend upon the prompt expansion of the United States Air Force, and upon maintaining that force at a level consistent with its tasks. These tasks are difficult and many, since wherever there is sky the Air Force has a vital interest. For air power is no longer a faith—it is a fact. The problem is not whether air power is real, but whether we shall be its masters or its victims.

Hoyt S. Vandenberg

THE AIR FORCE

One plane . . . one bomb . . . one city!

It has happened before. It can happen again. It could happen here. In case of a third world war it would happen many places.

Space has no shore lines. Fighter aircraft refueling in mid-air span the broadest oceans. With like procedure the bomber flies non-stop around the globe. Rocket propelled, the interceptor climbs to 40,000 feet in 65 seconds. Engineers design toward propulsive units of 25,000 horsepower. Radar directed bombs seek out targets concealed from the human eye. Progressively guided missiles plunge farther and farther across the distance. Upward—the WAC Corporal climbs 250 miles toward the stars. The hydrogen bomb looms on the horizon. The atomic engine promises aircraft power and range beyond any previous concept. Limitless speed awaits only greater thrust and already we have flown 500 miles an hour faster than the speed of sound.

The end result of these developments is to bring civilization up against a degree of vulnerability unknown to history. If superiority in aerial armament accrues to men or nations bent on conquest the free peoples of the world are doomed. But even if free nations emerged victorious in a war involving such weapons the total cause of human progress would be set back for centuries.

Patently the primary objective of military organization among free nations must be to prevent another global war. The Air Force has from its founding measured its capability against that objective and sought a degree of airpower that would be peace power.

In certain periods of history armies alone have decided the course of human events. At other times seapower has been the controlling force of international discipline. Nor are the uses and functions of armies and navies atrophied in current times. Each has specific and unique effectiveness for world order.

However, the day is past when either or both together by very existence even in preponderant measure can dissuade aggression in view of the revolution which flight has introduced into military science. Only airpower can do that today.

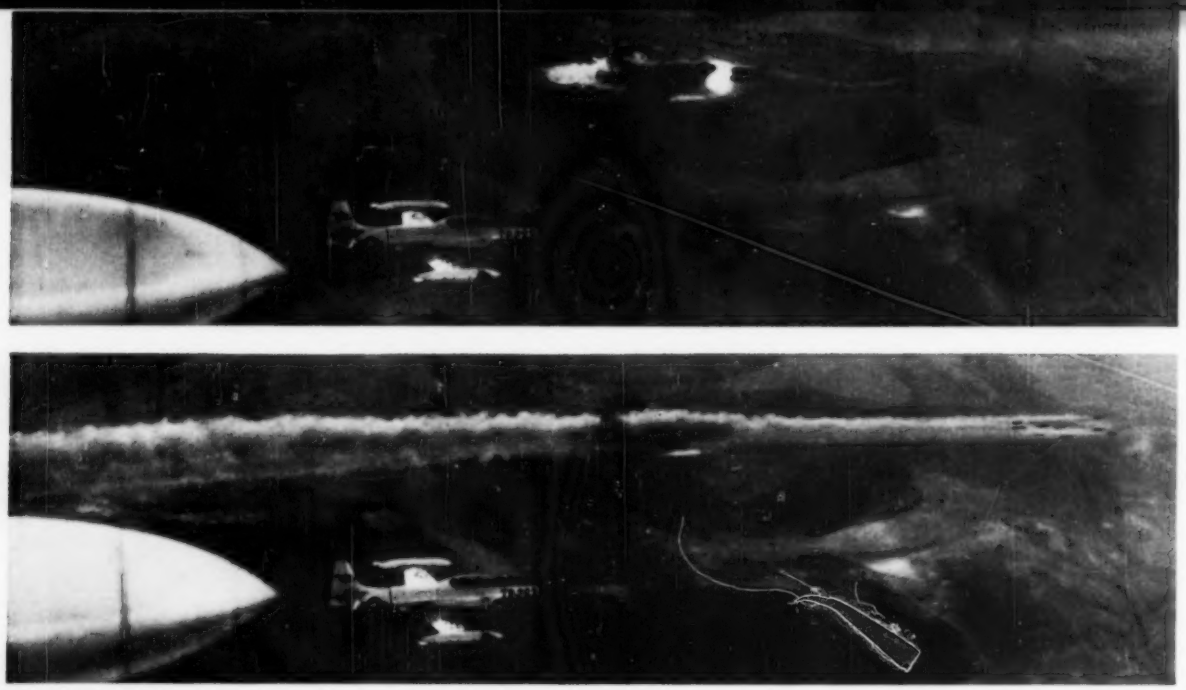
The capability of superior airpower to deter total war lies in the swift and lethal penalty it can exact from the heartland of an aggressor. But to be effective in *preventing* war the degree of air superiority over an aggressor must be unmistakable.

BROAD FOUNDATIONS

If the degree is unmistakable it will be evidenced in many facets. Strategic airpower is not a thing remote from total military strength but rather the apex of defense structure which includes all services and utilities. It connotes as foundation the broadest possible use of aviation in the organic structures of land and sea forces. It evaluates the aircraft carrier as a capital ship, the transport airplane as essential to logistics, the helicopter as an artillery observation post and an ambulance, the dirigible as a sentry against submarines.

It envisions air support of embattled infantry, air drop

Target coming up! From here on in, success of this B-29 strike depends on the bombardier-navigator—the little guy with the big punch.



A Lockheed F-94C *Starfire*, semi-automatic jet interceptor, fires its nose rockets in tests over the California desert. *At top*, with a brilliant burst of flame, rockets slash from the firing tubes. *Below*, a split second later, rockets scream ahead as their smoke swirls around the plane. The *Starfire*, carrying pilot and radar operator, flies almost wholly automatically in pursuing and attacking its target. "Talked" to the target by ground radar operators, the aircraft electronically locks onto its prey, tracks it, closes distance at 600 mph or more, takes aim and fires.

for paratroopers, air evacuation for wounded, and Marines airborne to beachheads where aviation engineers build flight strips to enhance the flexibility of strategic bombers and escort fighters.

Even beyond this, decisive air superiority connotes civilians in filter centers and watch towers, air industry free of restriction, universities crowded with youthful engineering candidates and airports teeming with private aircraft.

All of this and much more, such as a thriving system of domestic and international airlines, is the foundation and evidence of air superiority which in its climax of strategic power can go anywhere on earth and destroy any target chosen . . . and thus deny an aggressor the fruits of his ambitions.

Any service branch whose responsibility lies in a field as dynamic as that of airpower must itself be dynamic in concept and philosophy. Planning must be done in a realm where few precedents serve to guide. Decisions once made must be pressed against any odds. Only such balance of total national forces as assures air superiority can be acceptable to American security in light of the threat presently existing.

AIR FORCE STRUCTURE

With the foregoing as background we can more readily examine the stature of the Air Force in relation to its potential as peace power.

Statistics have but relative significance. The real guide to airpower lies in such basic factors as proportion of skills, industrial "lead time," continuity of research and economy of manpower. Breadth of concept, soundness of doctrine and the open mind are the only fully pertinent values.

The Air Force has an authorized strength of 1,200,000 for its 143-wing program. Total present strength is 975,000. Of this number 60,000 are rated officers. Output of new ratings for 1953 is calculated at 10,000—pilots, navigators, bombardiers.

Occupying 180 bases in the United States, the Air Force is also based at approximately 100 airports overseas and has personnel stationed in 29 foreign lands. Forty-two home bases are devoted to training.

Organizationally the Air Force is broken down into 17 major Commands and 21 numbered or named operational Air Forces. Major Commands are devoted to specializations such as Training, Air Defense, Tactical Air, Military Air Transport, Continental Air, Strategic Air, Air Materiel, etc. Training Command is largest personnel-wise . . . some 340,000.

Numbered or named Air Forces are assigned to the various major Commands. Thus Continental Air Command includes the 1st, 4th, 10th, 14th, and Aviation Engineer Air Forces. Strategic Air Command includes the 2nd, 8th and 15th Air Forces, while Tactical Air Command

Airborne supplies are dropped to isolated troops in Korea.

War and Peace! A South Korean family watches the airdrop of the 187th Regimental Combat Team by the 315th Troop Carrier Wing. From Consolidated's XF-92 *(right)* comes the phenomenal F-102, delta wing interceptor in production for the Air Force.

has the 9th and 18th. The 5th, 13th and 20th Air Forces are in the Far East; the 3rd and 12th in Europe.

Air Defense Command includes Eastern, Western and Central Defense Air Forces. Air Training Command has three Air Forces—Flying Training, Crew Training and Technical Training.

SOVIET COMPARISONS

In comparison with Red air development the U.S. program is extremely modest. Russia has spent the postwar years ruthlessly arming at the expense of civilian living standards. Contrastingly, we spent the first several postwar years disarming and the remainder, until now, trying to rearm without drastically interfering with our civil economy.

The United States tempo of aviation build-up represents a deliberately calculated risk of national security on the part of those responsible. Since 1947 the Soviet has produced twice as many tactical aircraft as has the United States for both Air Force and Navy. During the last five years the Reds have excelled in aircraft production, even in numbers of long range bombers. Today the Commander of Russia's strategic air force has at his disposal hundreds of TU-4's, the improved Soviet adaptation of the U.S. B-29. Moreover this force is continuing to expand and there is strong evidence that a bomber midway between the B-29 and the B-36 is scheduled shortly to join Red air units.

The circumstance imparting such gravity to the rise of

Soviet strategic air forces is the companion rise of the communist atomic stockpile. A third element to be noted is her expansion of radar and anti-aircraft defense. Russia is fully aware that the free nations will not make war of aggression against her. The fact has been tested in her experience. Unless she herself has total war of aggression in mind, why the vast war effort?

Quantitatively Russia has 40,000 combat planes—20,000 in organized units and an equal number in reserve. Comparatively the U.S. has about 10,000 planes in units and none in reserve. A high percentage of Soviet aircraft are jets—so much so that Russia has been able to supply jets to her satellites and furnish them for the Korean theatre in vastly greater numbers than the United Nations have been able to do.

AIR FORCE TASKS

The build-up of the USAF to 143 wings, of which 126 will be combat, has been undertaken to the end that in the event of general war it could discharge three initial tasks:

First: to defend critical areas in the Western Hemisphere, with particular emphasis on repelling atomic attack;

Second: to conduct a strategic air offensive against vital sources of enemy war-making capacity;

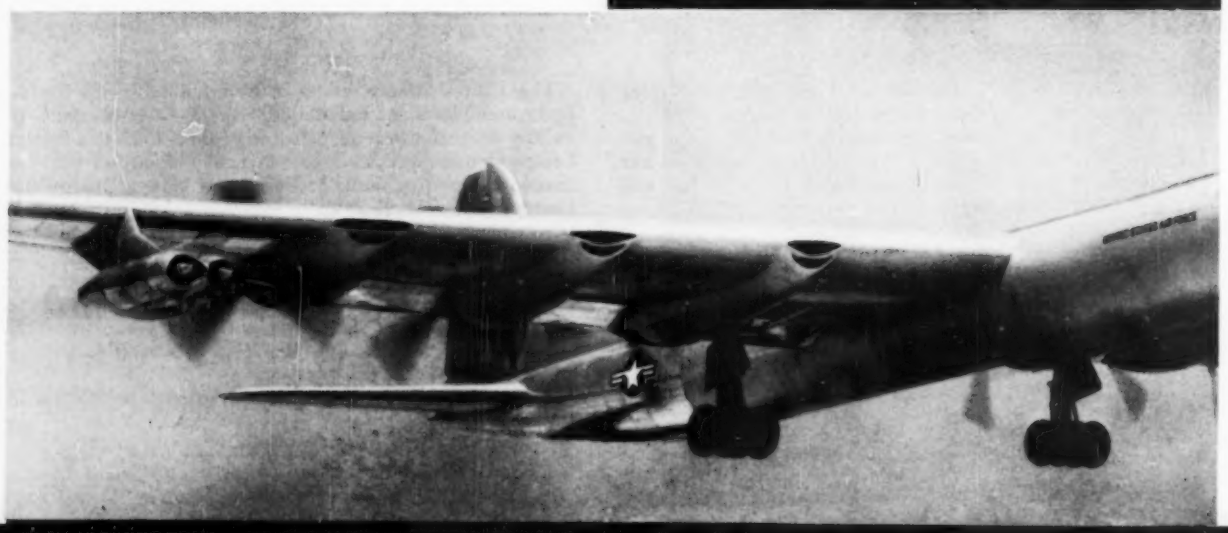
Third: to assist by joint operations in the defense of the NATO area and critical areas in the Far East, including lines of communication.

None of these three tasks can be carried out if the enemy should control the air. Only with air superiority could the United States and its allies hope to defend Western Europe. Above all, the protection of the United States, its cities, industries, ports and military installations, demands air control.

HOME DEFENSE

With regard to the first of these tasks, an effective home air defense involves a combination of interceptors and anti-aircraft weapons together with an elaborate radar warning system. Air Defense Command is the Air Force agency charged with this responsibility. The North American F-86, the Northrop F-89 and the Lockheed F-94, jet interceptor fighters assigned to its Eastern, Central and Western units, are equipped for all-weather operation, and crews are maintained on alert 24 hours a day. Air Defense Command mans a radar screen extending across the most probable air approaches to the United States, and operates a communications network that can transmit instantaneous data of the approach of enemy formations.

However, since the present radar screen is inadequate to cover all approaches to the country, and because of



The cavernous air intake of a B-36 pusher-mounted piston engine provides a porthole for three mechanics at Sheppard AFB, Texas.

Convair's B-36, first intercontinental bomber, has a 10,000-mile range that will carry it from the U. S. to the heart of the industrial Soviet, if necessary. Gross weight of 358,000 lbs. could include 42 tons of bombs. Four turbojet engines of 5,000 lbs. thrust each and six piston engines of 3,500 hp each power the B-36D at left. *Above*, an all-jet B-47 *Stratojet* takes off with JATO.

difficulty in detecting low-flying aircraft even with excellent radar, a Ground Observer Corps has been organized and is supervised by Air Defense Command. This Corps of devoted civilians is manning observation posts on a round-the-clock basis in 27 states. These posts are linked to ADC by commercial telephone.

The anti-aircraft artillery command of the United States Army is a vital part of the air defense system. To assure closest cooperation between Air Force and Army, the Army's top anti-aircraft commander and the commanding general of ADC occupy a joint headquarters.

Radar picket destroyers and submarines of the Navy have a great potentiality as early warning stations along the Atlantic and Pacific approaches of the country. Working agreements between Air Defense Commanders and Sea Frontier Commanders have been established and actual joint air defense practice has been carried out. The Air Force is seeking a substantial extension of the arrangements that now exist. But despite the best air defense measures the odds still favor an attacker by a wide margin. A considerable portion of any bomber attack, pressed home with force and resolution, will almost always succeed in reaching its target. Hence the second principal element: a long-range bomber force to reduce the aggressor's atomic capability at its source.

LONG RANGE COUNTEROFFENSIVE

Long range counterattack, as a function of our defense, falls to the Strategic Air Command, which is also charged with the second major task—swift destruction of the aggressor's war-making resources.

Strategic Air Command is a true D-Day striking force. Its all-important purpose in case of war would be to deliver the American atomic stockpile against an enemy in a succession of blows concentrated in a campaign lasting at most a few months and possibly a few weeks.

Industries in four great areas of the Soviet Union—central Siberia, the Ural Mountains, Moscow, and the Don Basin—supply the arms and weapons, the fuel and ordnance, in short, nearly everything necessary to maintain the Red fighting forces in the field, on the sea, or in the air. Blasting of these industries by a concentrated atomic offensive would cut off the Soviet strength at its source

Interdiction by the Republic F-84G *Thunderjet* in Korea has eloquently illustrated the sound employment of airpower in ground support.

before it could inundate the free countries of Europe and Asia. That all of these industries are deep within the iron curtain makes them vulnerable to attack only by aircraft having the longest range. SAC's long-legged bombers are the only planes that can do more than nibble at the periphery of the Soviet land mass.

These aircraft—the B-29 of World War II and Korea, its postwar improvement, the B-50, the all-jet B-47, and the intercontinental B-36—all are capable of carrying atom bombs. All have the range to reach the industrial heart of the Soviet from existing bases—the 3,000-mile B-47, the 4,600-mile B-29 and the 6,000-mile B-50 from the Far North, Europe, North Africa, or the Far East, and the 10,000-mile B-36 from this country if need be.

TACTICAL AIR FUNCTION

The third task confronting the United States Air Force is a double responsibility. Its first part, the defense of Western Europe against invasion, is primarily a problem of land-air warfare. Tactical units of the Air Force, supplied to the European theater by Tactical Air Command, are organized with this fact in mind. In a land-air struggle for Europe, these units would have two principal tasks. First, to defeat enemy air and gain that vertical control without which NATO armies could not operate. Second, to attack enemy armies in the field; to destroy land lines of communication (including roads and railroads) and supply centers; to deny enemy freedom of movement and at the same time to add to the firepower of our ground forces through close air support.

Air Force tactical units would be assisted by the Strategic Air Command which, in addition to its other tasks, is charged with blunting, retarding, and disrupting any enemy offensive. Some units of the SAC would probably be used in battlefield support, some would undoubtedly concentrate their efforts against enemy air facilities, and others would be engaged in attacks upon sources of industrial productivity. All three of these efforts would operate to relieve enemy pressure on ground and air forces in the NATO area.

Another aspect of the third major Air Force task, the defense of critical areas in the Far East, presents a special case. The Air Force now has a sizable portion of its total combat strength in place there, chiefly for employment in the Korean War. Despite this fact, the communists heavily outnumber the United States and its allies in this area. Therefore, so long as the present situation in the Far East continues, any withdrawal of allied air strength would certainly invite an extension of communist aggression in that part of the world.

AIR FORCE PROGRESS—PRE-KOREA

The present Air Force build-up toward its stature as peace power dates from the beginning of the Korean War. In June, 1950, the Air Force had an authorized strength of only 48 wings. Forty-two of these were combat wings. The rest were transport. Not all of the wings were at full strength, and only one airplane in eight was jet powered. A much smaller fraction was electronically equipped for all-weather combat.

This force, fortunately, was not a true measure of the combat potentialities of the Air Force at that time nor did it reveal the progress the Air Force had made in the field of Research and Development after World War II. In October, 1947, Captain Charles E. Yeager in the experimental X-1 broke through the sonic barrier to become the first man to fly faster than the speed of sound. A year later, an Air Force F-86 with full military equipment established a new world's speed record over a measured course at 670 miles an hour. In the same year, an Air Force B-36, the first truly intercontinental bomber, took to the air with a gross load of 300,000 pounds, the heaviest load lifted by an aircraft to that time.

The B-36 was originally a propeller-driven airplane, but even while first models were being tested, the Air Force was pushing ahead with development of jet bombers. The prototype of the B-47, a medium jet bomber intended to supplant the B-29 and the B-50, was produced in the same year. One of these early B-47's crossed the United States in three hours, 46 minutes. The non-stop, round-the-world flight of the B-50, "Lucky Lady," in 1949 demonstrated dramatically the feasibility of air-to-air refueling. Nonetheless, when the Air Force was called

upon to help defend the Republic of Korea, 8,000 of the Air Force's 10,000 combat planes were WW II types.

KOREAN WAR

On June 26, 1950, the day after North Korea began the war, Air Force planes went into action—the first United Nations force to enter the fight beside the troops of the Republic. For the first month and a half of the conflict the Air Force fought in the air almost single-handed. Between June 26 and August 15, the USAF flew 84 per cent of all sorties flown by U.N. forces in Korea (almost all of which were tactical in purpose) and 90 per cent of all close support sorties. The North Korean Air Force was destroyed within a few days, and our ground troops were able to stabilize the front above Pusan and a few months later to drive to the Yalu.

Entry of Chinese communist armies into the Korean War drastically altered the ground situation. When, in late spring of '51, the front was again stabilized, this time in the vicinity of the 38th parallel, U.N. troops found themselves outnumbered by communist enemies about two and a half to one. Air Force close support and even more importantly air interdiction made an enormous contribution to the U.N. ground troops' success in establishing favorable positions and subsequently in holding them.

Improved Lockheed F-80 and Republic F-84 jet fighter-bombers and propeller driven F-51's and Douglas B-26 light bombers harassed enemy supply lines, warehouses, gun emplacements, and troop concentrations during the day. At night B-29's and B-26's took over the attack in a relentless round-the-clock operation. The enemy paid an enormous price in rolling stock, facilities, troops, and supplies to remain in Korea at all. In addition, he was forced to expend incalculable manpower on repairs and in back-packing of supplies. When the enemy called for truce in June, 1951, he was in a critically precarious position.

After destruction of the North Korean Air Force, U.N. air supremacy was absolute and unchallenged until September, 1951. Then, while truce talks slowed ground action to a standstill, permitting the communists to achieve a slow build-up of frontline supplies, the Soviet MIG-15 began to appear in great numbers south of the Yalu. In addition to increasing MIG action from inviolate bases north of the Yalu, the communists began to build a number of jet bases inside North Korea itself.

The Air Force answer to this threat was to attack the projected Korean bases with B-29's and to challenge the MIG's, whenever they appeared, with F-86 fighters. After frantic efforts to rebuild their North Korean air bases, the communists conceded defeat on this point, but continued with MIG attacks from Manchuria.

The F-86 was extraordinarily successful from the outset in neutralizing these attacks. From beginning of the Korean War to November '52, 448 MIG's had been destroyed by the F-86's, while only 49 F-86's had been downed by MIG pilots. The B-29 turret gunners had the next highest MIG score.

A more significant measure of success in maintaining United Nations air control over North Korea is the fact that in flying 920,350 combat sorties by all services since the beginning of war a scant hundred U. N. planes of all types have been shot down by communist fighters.

TOWARD 143 WINGS

While compiling this record in Korea the Air Force has been building its overall strength, first from 48 wings to 63, then to 95 and finally toward the 143 wings now authorized. In growing from the 95-wing size to the 143 wings authorized, the Air Force plans to increase its effective strength 50 per cent while increasing the number of people in the Air Force only 18 per cent. This is a bold challenge to those responsible for management of Air Force manpower. Thus far the challenge has been met.

In procuring aircraft to equip the projected new wings and in modernizing the old, the Air Force and the aircraft industry have had to solve many problems. Production of the modern weapons of aerial war, a result of the marriage between atomic power and air power, is costly and time consuming. Only during the past year have the build-up decisions made in 1950 been reflected noticeably in equipment changes. Current manufacturing "lead

times" require at least that much leeway to produce modern craft in appreciable quantity. Airplanes are growing bigger, more complex, and more powerful. Types of Air Force jet fighters weigh two-thirds as much as World War II heavy bombers. Twice as much engineering was involved in designing the F-86 as the F-51, and the former takes more than twice as many man hours to build.

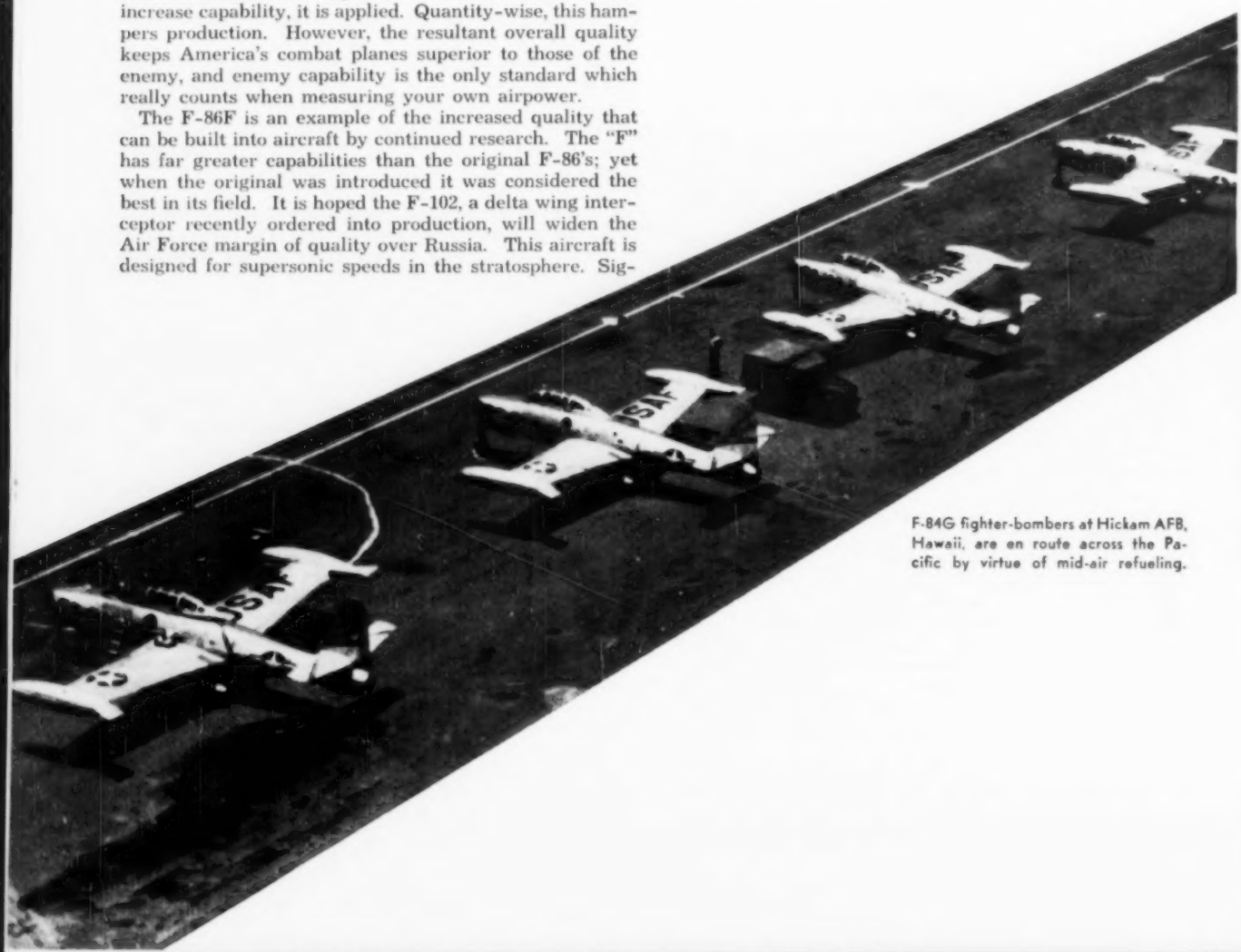
It is the same with engines. The average present-day jet engine produces three and a half times the horsepower of the average World War II engine, and is correspondingly more difficult to build. A leading engine manufacturer recently calculated that the aircraft engine program already on the books calls for production, in 1953 alone, of 700 million horsepower compared to a production of 431 million in the peak year of World War II.

Despite these formidable problems, there has been a major degree of conversion from piston to jet engines during the past two years. While Korean losses and normal attrition, coupled with transfer of aircraft to our allies, have kept the Air Forces' total plane inventory from increasing greatly since 1950, the proportion of modern combat-ready aircraft has improved considerably.

The Air Force and aircraft manufacturers have never ending problems of research and development to improve combat capability over enemy technological advance. After a certain amount of research and development it becomes necessary to put a given model into quantity production to fill a predetermined need. At the same time, research on a particular model must continue so that the basic aircraft can be improved. When modification will increase capability, it is applied. Quantity-wise, this hampers production. However, the resultant overall quality keeps America's combat planes superior to those of the enemy, and enemy capability is the only standard which really counts when measuring your own airpower.

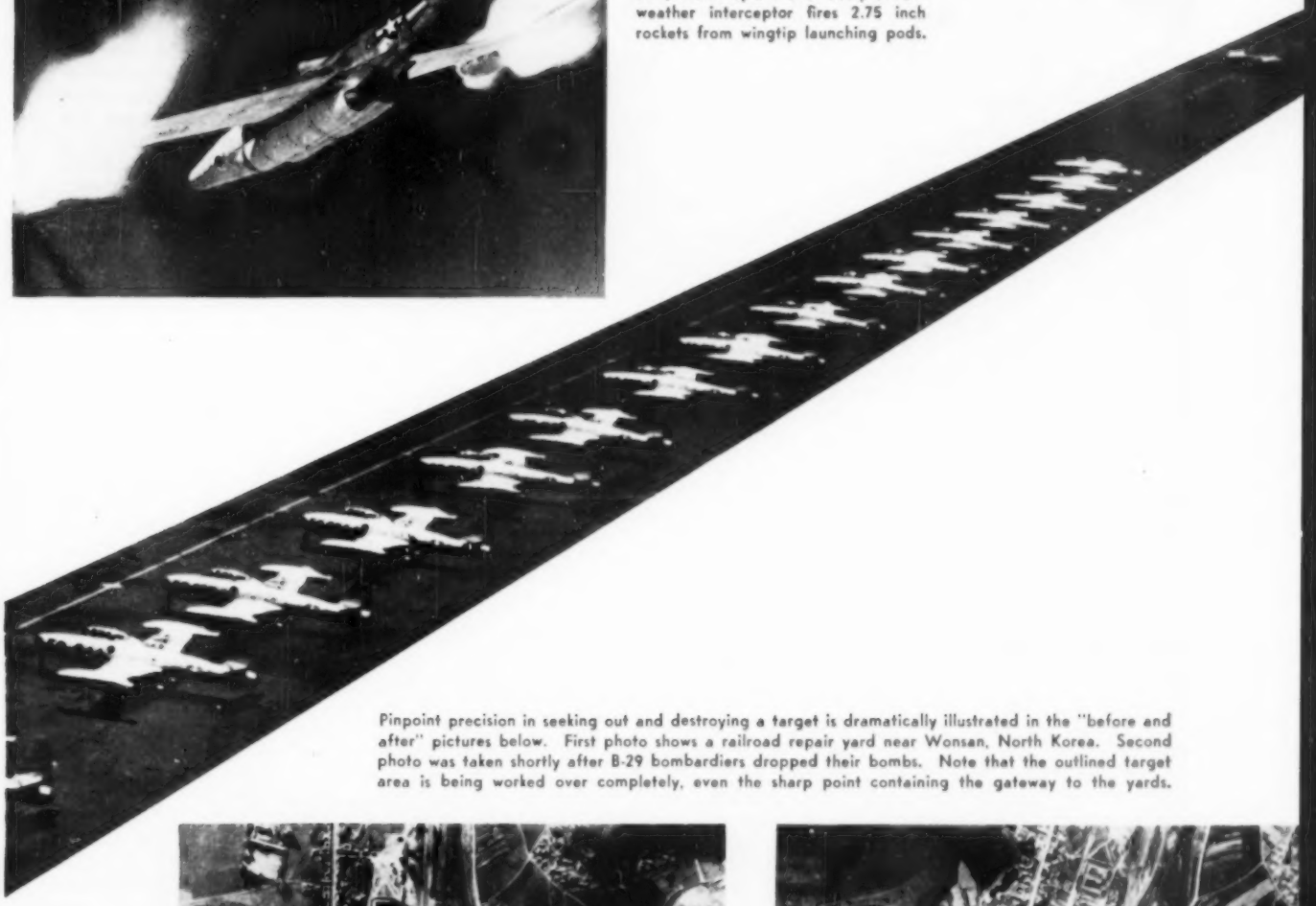
The F-86F is an example of the increased quality that can be built into aircraft by continued research. The "F" has far greater capabilities than the original F-86's; yet when the original was introduced it was considered the best in its field. It is hoped the F-102, a delta wing interceptor recently ordered into production, will widen the Air Force margin of quality over Russia. This aircraft is designed for supersonic speeds in the stratosphere. Sig-

WAF meteorologists release balloons for study of air currents. Tracked by radar, balloons tell wind direction and velocity at various levels.

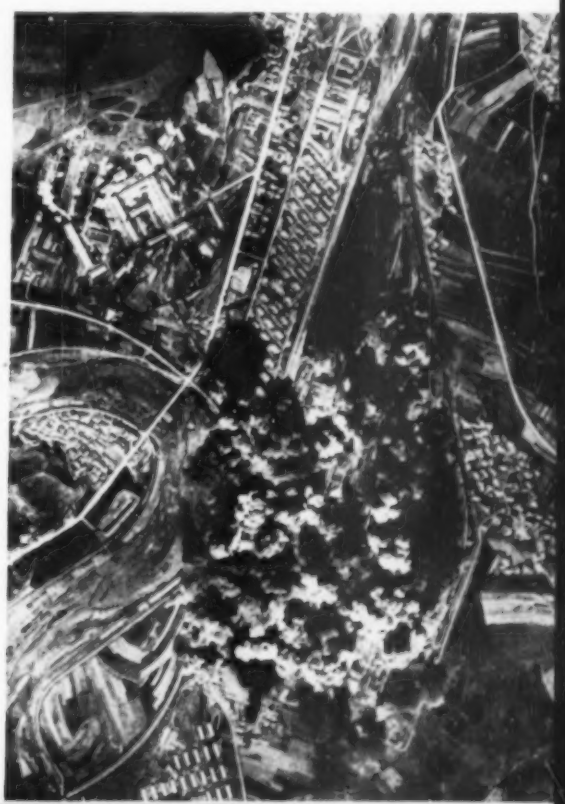


F-84G fighter-bombers at Hickam AFB, Hawaii, are en route across the Pacific by virtue of mid-air refueling.

Left, Northrop's F-89D *Scorpion* all-weather interceptor fires 2.75 inch rockets from wingtip launching pods.



Pinpoint precision in seeking out and destroying a target is dramatically illustrated in the "before and after" pictures below. First photo shows a railroad repair yard near Wonsan, North Korea. Second photo was taken shortly after B-29 bombardiers dropped their bombs. Note that the outlined target area is being worked over completely, even the sharp point containing the gateway to the yards.



nificant improvements in armament and electronic equipment will be incorporated and it will have an extremely high rate of climb.

Performance and configuration details of the F-102 are secret, but the Air Force has announced that it would resemble in shape, though not necessarily in size, the XF-92, with which the Air Force has been experimenting extensively. The XF-92 is the first delta wing aircraft known to fly.

Pilotless aircraft are still more advanced products of the research program and eventually will be integrated into combat units. These aircraft are equipped to function without a human aboard and designed to operate in offense, defense, reconnaissance, and escort missions. They are true guided missiles whose flight path can be altered by mechanisms within themselves for use in ground-to-air, air-to-air and air-to-ground projects. They have evolved logically from piloted craft.

Pilotless aircraft units will be organized initially as additions to existing Air Force wings. A squadron of *Matadors*, a bomber-type missile recently designated as the B-61, was formed over a year ago.

Pilotless aircraft are very expensive, because generally they cannot be used more than once, yet the advent of atomic weapons makes the enormously costly missile a profitable possibility. A pilotless interceptor that could destroy an enemy atom-bomber with something like absolute certainty would be an invaluable asset at almost any price. However, it is not anticipated that pilotless aircraft will replace piloted in great numbers for some time. For the immediate future pilotless craft will be utilized chiefly to increase the capabilities of manned aircraft in air-to-air and air-to-ground operation.

As to quantity, the United States is not trying to keep up with Russia in sheer numbers of planes. American manufacturers are not going "all out" production-wise in the military field as they did during World War II, but have geared their lines to a moderate pace. That pace, projected over the next two and a half years, has been established by the Air Force within the limits of its authorized budget. It is this limitation on quantity which lends emphasis to the urgent need for quality.

WORLD-WIDE BASES

To assure flexibility in operating its expanding organization, the Air Force has built a network of new air bases, and rebuilt or expanded many of the old ones built during World War II. Many of the latter had fallen into a state of serious disrepair following demobilization at the close of the war.

New runways have been laid down and old ones have been lengthened and strengthened to accommodate the heavier and more powerful modern aircraft. Repair depots have been established and facilities erected to provide adequate storage for weapons and ammunition, parts and engines, vehicles and heavy equipment, fuel, food, clothing and medical supplies.

This gives the Air Force bases ranging from the British Isles and Europe to North Africa; from Labrador, Iceland, and Greenland to Alaska, Japan, and the far islands of the Pacific. Together with bases in the U. S., the layout enables the Air Force to place its strategic power within reach of any industrial and military installations on earth.

Recently re-stating the Air Force's position in the field of strategy, Secretary of the Air Force Thomas K. Finletter said, ". . . The possibilities inherent in night missions and radar bombing, available methods of deception and multiple attacks from many points of the compass, will present to any enemy a most formidable task in detecting, tracing, and attacking our bombers."

The Air Force, with its new wings, its growing inventory of modern aircraft, and its expanding base system stands in a unique position with regard to national security. It is directly charged—if war comes—with striking from aggressor hands the weapon most dangerous to this nation—enemy airpower, and through air counterattack, with carrying the war *at once* to the central sources of enemy strength.

As we said in the beginning, this is not to imply that land and sea power are no longer vital. On the contrary, nothing short of an all-out coordinated strategic effort on the part of Army, Navy, Marines and Air Force could achieve final victory. General Hoyt S. Vandenberg, Air Force Chief of Staff, has himself stated, "It would be a blatant airman indeed who claimed that the atomic bomb in combination with land-based airpower was the only important ingredient in the strength of our national position." Nevertheless, while it is conceded by most military strategists that air superiority alone may not win a future war, it is axiomatic that lack of superiority in tomorrow's air must lead inevitably to loss of war.

The ultimate strategic objective of each of the military services is identical: reduction and elimination of the military power and potential of an enemy. The degree and manner in which each contributes to the attainment of the final objective, total victory, is dependent upon the capabilities and limitations of the weapons employed by each in dealing with the particular military situation. For its part, the strategic objective of land-based airpower is elimination of the enemy's military potential by direct attack on its sources.

In pursuing this objective, the bulk of the Air Force is almost certain to be instantaneously engaged at the outbreak of any general war. It yet has a long road to travel to bring up its ready strength to a level consistent with these tasks. Yet surely the permanent answer to aggressor challenge lies to an important degree in building an Air Force of adequate size and quality. The traditional application of the military principle of massed armies or fleets is being closely re-examined by reason of the fantastic increase in the firepower of weapons already available and in near prospect. Masses of men and ships offer lucrative targets for weapons of mass destruction. The best, if not the only, answer to such firepower is dispersion. The necessity for dispersion makes impracticable, if not impossible, a strategy based upon traditional mass employment of surface forces. In effect, the Principle of Mass has moved from men to weapons, for the simple reason that it is no longer necessary to mass men in order to produce decisive concentrations of firepower.

Today a few airplanes, manned by a few men, can drop an explosive charge equal to that of all the bombs dropped on Germany during the last war. Atomic bombs can be carried by fast fighter aircraft, as well as by long-range bombers. Through the development of refueling techniques the range of fighter aircraft is being lengthened to a point where it approaches that of a present-day medium bomber. The net effect will be further to enhance the inherent flexibility and versatility of airpower, and ultimately to transform the entire combat Air Force into a potential atomic weapons system. The end-product of this technological revolution will be a perfected weapons system fitted to the engineering and industrial talents of the American people, and exemplifying the most effective employment of their limited manpower resources.

Until the free nations of the world can weld their combined strength into a shield for mutual security, this weapons system—the United States Air Force—will remain their main defense against aggression and continue to be the primary deterrent to war. END

GENERAL J. LAWTON COLLINS

Chief of Staff, United States Army

By devoting an entire issue of FLYING Magazine to the Armed Forces, the editors are performing a valuable service to the American people. I wish to compliment them for undertaking this important task.

The role of science in war is becoming increasingly important. Electronic computers, supersonic aircraft, guided missiles, atomic artillery and other scientific advances have vastly increased the potentialities of our Armed Forces in providing for our national security.

But the most advanced scientific wonders can never replace the individual soldier on the battlefield. It still takes men to hold lines on the ground, using rifles, grenades, machine guns, tanks, artillery, and other modern weapons to inflict defeat upon an enemy and gain the final victory.

Naturally, we in the Army have continued to emphasize the importance of the individual soldier—the lessons of Korea have reaffirmed how necessary he is, and how magnificently he responds to every threat to our freedom. But, at the same time, we are determined that our soldiers will have the benefit of every scientific and technical advance that the inventive genius of America can produce.

Concern for the welfare of the soldier and respect for him as an individual are still the Army's guiding principles. The advent of the atomic age has not invalidated these principles, but has instead given them new meaning and importance. In this age, as in all ages, man remains the supreme element in combat.

J. Lawton Collins

THE ARMY

The Army is engaged today in the most complex task of its history. As Chief of Staff, General J. Lawton Collins, puts it, "We are partially mobilizing; we have a war on our hands 5,000 miles from home; and we are partially demobilizing—all at the same time."

The mission of Army is unchanged: to help prevent war or to help win it. Something of the increased vastness of that present undertaking is illustrated by the global nature of Army's responsibilities. Seeking to prevent World War III, American soldiers are stationed overseas to an extent never before known in peace-time.

If free Europe, important to America's security, is to be defended against possible communist assault, powerful land armies are indispensable.

Therefore, the U.S. Army has deployed in Europe five of the 20 divisions which form its hard core, plus supporting troops. At the same time, under NATO, Army is training allies in use of American weapons and machines and in employment of U.S. Army techniques—5,781 foreign nationals graduated last year in Army courses. In so doing, Army has aided greatly in molding European armies into effective fighting forces.

Not only in Europe but throughout the free world American soldiers are on guard against communism.

GLOBAL DUTY

The global activity started after World War II, when administration of civil affairs in Germany, Japan, Korea, Trieste, Italy, Austria, and the Ryukyus was entrusted to the Army. Then, in quick succession, even greater responsibilities were handed down as a result of American participation in the United Nations and such regional security arrangements as NATO.

Participation in the Mutual Security Program has carried Army representatives to 34 countries, including 10 in Europe, four in the Middle East, 14 in Latin America, and six in the Far East. Responsibilities of these forces are heavy, for daily they help shape our relations with other peoples by administration of the military facets of our foreign policy. These responsibilities must be met, however, if Army is to do its part in making America the hope of the free world.

In June, 1950, Army's global responsibilities were made more difficult by communist aggression against the UN-sponsored Republic of Korea. U.S. troops were quick to meet that aggression and today are still locked in bitter, brutal combat with the fanatical Reds.

During late years, Army has forged the most effective combat divisions the world ever has seen. Man for man, they have more killing power than any other fighting divisions on earth. With only 20 per cent increase in roster the modern Infantry division has 68 per cent more firepower than its World War II predecessor. Similar increases prevail in Armored and Airborne divisions.

But deadly efficient as is the Army in Korea, a ruthless foe with little regard for its own soldiers has been willing to suffer 10-to-one casualties to take its toll of Americans.

Total U.S. casualties had grown to nearly 130,000 as of February 1. The fact that Army suffered more than 80 per cent of these casualties reveals better than anything else the burden it has carried.

Every man who has fought in Korea readily admits that fighting in the rugged hills and rice paddies has been among the hardest ever faced by American soldiers.

However, in meeting communist challenge the Army has learned much.

For one thing, the combat power of the Army has been tested under the most adverse conditions. The basic concept of superior firepower versus troop mass has been proved over and over again in actual combat against troops armed with Soviet weapons and fighting under Soviet military doctrine.

Above all, Korea has reaffirmed the importance of the ground soldier. To stop and ultimately defeat an enemy army, land areas must be controlled finally by land forces.

In carrying out its mission, Army is faced with three im-

"It still takes men . . ."

Personnel of Battery B, 937th Field Artillery Battalion of the Eighth Army, fire their Long Toms in support of the 25th Infantry Division.

Members of Company E, 179th Infantry Regiment of the 45th Infantry Division, man their Browning automatic rifle in a Korean trench.

mediate military objectives: to create power against quick disaster; to possess capability for swift and strong retaliation; and to have a foundation upon which to build overwhelming force for assuming the offensive. A look at the current status of Army shows the great progress toward these objectives.

MANPOWER

After World War II, while the Soviet Union continued to build and improve its ground forces, the U.S. rapidly demobilized its Army to the point of military ineffectiveness. Thus, at the outbreak of the Korean conflict the Army had an authorized strength of *630,000*—an actual strength of only *593,000* including U.S. Military Academy cadets. Major units, all at greatly reduced strength, consisted of 10 divisions, 12 separately organized regimental size units, and 48 anti-aircraft battalions.

Furthermore, the strength of all units in Army's operating forces totalled only 325,000. Engaged chiefly in occupation duty, Army's principal activity was a training program to produce replacements for enlistment terminations and to develop skills for occupation functions.

The Army of today bears little resemblance to that which sent its understrength divisions against the Korean Reds. Army strength on 1 January 1953 was approximately 1,600,000 with about 60 per cent in operating units—20 divisions, 18 separate regimental-size organizations, a greatly increased number of anti-aircraft battalions, and other supporting units.

Since June, 1950, Army has clothed, fed, housed, trained, and integrated into active service more than one and a half million persons. Nevertheless, despite completion of the build-up, manpower continues a problem. During 1952 for example, the net strength of Army increased only 65,000, although in that period there was a turnover of approximately a million men—500,000 entering and about the same number leaving. Looking ahead, Army will lose more than 750,000 men in this fiscal year alone.

RESERVE FORCES

The value of reserve forces in assisting Army to carry out its mission was never better illustrated than when these 'Minute Men' answered the call at the beginning of the Korean conflict.

At that time Army ordered more than 2,000 company-size National Guard and Organized Reserve Corps units into active service. Since these units were themselves short of trained men, their manpower reservoir subsequently was further tapped.

The first Guard units were ordered to active duty in August 1950. By 30 June 1951, National Guard organizations from nearly every state and territory, as well as the District of Columbia, were in service.

During the current fiscal year, a total of eight Guard Divisions, three regimental combat teams, and many combat support units are in the field. Included are the 40th and 45th Infantry Divisions in Korea, the 28th and 43rd Infantry Divisions in Europe, and the 31st, 37th, 44th and 47th Infantry Divisions in the United States.

Responding with similar effectiveness, as of 1 June 1952, the Organized Reserve Corps had provided a total of 71,800 officers, 155,500 enlisted men, and 969 units since outbreak of hostilities. Indicative of the part Organized Reserve continues to play in augmenting the Army the strength of the Active Reserve as of 30 June 1952 was 135,658 officers and 204,922 enlisted personnel. During the last fiscal year approximately 25 company-size units were

Above, the Second Infantry Division in action high among the clouds on a Korean hillside.

Right, men of Battery C, 936th Field Artillery, shell a Chinese communist stronghold.

ordered to active military service.

By the second anniversary of the Korean action, reservists had won 12 of the 53 Medals of Honor presented.

Many guardsmen and reservists who reported for Federal service early in 1951 have completed their required tours and been released. Thus, despite some further recalls, at the end of the fiscal year only four per cent of the total enlisted strength of Army was Organized Reserve and Guard.

The importance of the citizen-soldier, however, has not diminished. Reserve units not on active duty are carrying out vigorous training programs designed to fit them for emergency. Supervised by the Chief, Army Field Forces, National Guard organizations under state control are training diligently. Taking part in this program are 19 divisions, 17 regimental combat teams, numerous anti-aircraft battalions, and approximately 5,000 company-size combat support units. A total of 48 armory drills annually and three weekends (six days)—has been authorized for their training program.

Training for Organized Reserve Corps units on an active cadre status—25 infantry divisions and many combat service support units—has also been stepped up. For example, units of the Active Reserve designated as Early Ready Units have been placed on a 48-drill category regardless of the minimum strength levels previously required.

WOMEN'S ARMY CORPS

At outbreak of hostilities in Korea, about 7,000 WAC officers and enlisted women were on duty. Since then the number has grown to 12,000, though authorized strength is 30,000.

In 145 different types of jobs, members of the Corps are serving on more than 70 Army posts, camps and stations as cartographers, intelligence specialists, medical and dental technicians, high speed radio operators, secretaries and in kindred positions. Their excellent performance of non-combatant duties has enabled Army to train and send additional thousands of troops to battle areas.

About 30 per cent of WACs are now serving overseas—in England, France, Germany, Austria, Italy, the Caribbean, Japan and Okinawa, and more than 1,500 are supporting United Nations troops, although none are in Korea.

ARMY NURSE CORPS

If there is a heroine on the Korean battlefield, unquestionably it is the Army Nurse.

The first nurses in Korea were rushed from Japan 10 days after fighting started. Some helped set up Mobile Surgical Hospitals, one of which normally supports each division in the line. Others helped establish evacuation hospitals further to the rear—in tents, in open fields and in window-less, bombed-out schoolhouses.

As of 1 August 1952, 250 nurses—all volunteers—were serving in Korea. They and the more than 1,000 others who preceded them, have contributed immeasurably to reduction of the death rate among U.S. soldiers.

Twelve nurses are assigned to each Mobile Army Surgical Hospital which, equipped to do major emergency surgery, constitutes one of the most important links in the medical support "pipeline." A critical handicap in working close to front lines is lack of pure water. Frequently it must be carried to MASH units in huge cans and boiled by the nurses on gasoline stoves.

Wherever Army forces are stationed, the Army nurse is on the job—working to save lives. One of Army's big-

gest problems today is to recruit enough nurses to meet requirements. In this connection, the Army Nurse Corps and civilian hospital groups are now cooperating in a plan designed to boost current Army nurse strength to 7,200 without depriving civilians of necessary care.

MOBILITY AND FIREPOWER

Though Army has grown in size, figures alone do not tell the whole story. While engaged in mobilizing, demobilizing and fighting, a new Army has been created—one that relies on highly skilled soldiers, heavier and more effective firepower, and greater mobility than any other Army in the world.

Largely responsible for long strides toward increasing Army's mobility and firepower is an intensive program of research and development. During the last year alone, 295 new projects were started. The story of tank development is typical.

When Korean war broke, no new tanks were in production. Instead, Army was in the process of modernizing 800 World War II tanks. However, Army Ordnance, with limited money appropriated for tank development, had been working to improve the tank. It developed, for instance, a whole new line of air-cooled engines and a tougher and more versatile transmission, and made improvements in fire control and other turret mechanisms.

In Korea the communists have the Russian T34 tank, which weighs about 35 tons and is armed with a high-velocity 85mm gun. At first our forces fought at a disadvantage since they were equipped with the light *Chaffee*, weighing 20 tons and carrying a 75mm gun.

The Cessna L-19 "Bird Dog," versatile observation plane.

NEW TANK TYPES

Later, the *Pershing* (M26) and the *Patton* (M46), both just over 45 tons and both armed with 90mm guns, made their appearance. The *Patton* is much faster, incomparably more maneuverable, and more heavily armed and armored than the Soviet T34. Subsequently, a new improved medium gun tank, the M47, was adopted as an interim weapon. This tank is currently in service in Europe, where it is proving extremely popular.

Just out of wraps is a completely new medium gun tank, the *Patton* 48, which Secretary of the Army Pace has called "the finest medium tank on earth." This 49-ton weapon has a lower silhouette than other comparable tanks, an egg-shaped, sloping elliptical hull and turret that makes it exceedingly difficult to damage with enemy fire. It is mounted with a 90mm, high-velocity gun with a quick change tube, and in addition is equipped with two .30 cal. machine guns coaxially mounted with the 90mm, and with another .50 cal. machine gun over the commander's cupola. This tank also effects a saving in manpower, being operated by a crew of four, where its predecessors all require a five-man crew.

ARMY AIR

In the airborne field, sharp advances have been made in delivery of personnel and equipment by parachute. Tests by Army Field Forces are completed on a new parachute with reduced opening shock, dampened oscillation, slower rate of descent, and general safety and reliability features, all of which increase ability to jump from higher speed planes.

Tests are also completed on aerial delivery of the 2½-ton truck, and experimental drops of heavy equipment, including a 15,000-pound caterpillar grader, have been conducted using clusters of 100-foot diameter parachutes. This is in marked contrast to operations in World War II, when the heaviest drops consisted of such items as the 75mm pack howitzer broken down into loads of only 300 to 400 pounds.

Answering Army requirements, the Air Force has developed larger cargo planes which carry bigger loads farther and faster than ever before. Whereas it took nine C-47's in World War II to carry the old 193-man rifle company, today the C-124 carries all but 11 men in the present 211-man company. Additionally, much standard Army equipment has been redesigned and made lighter and less bulky for air transport.

Development of aircraft for Army's own organic needs is also keeping pace with the times. The importance of Army aviation is attested by the fact that in Korea it has flown approximately 86,000 forward missions, 103,000 administrative missions, and made over 7,000 front-line evacuations. At present Army is procuring five different models of fixed wing aircraft and five helicopter types for use in support of front-line operations.

Below, wounded are strapped to a Bell 'copter of the 2nd Helicopter Detachment for evacuation to rear areas.

Aerial delivery of personnel and equipment means new mobility for today's Army. *Above*, a three-quarter-ton truck is dropped by means of three parachutes. *At left*, airborne troops float down to rough terrain.

ARMY 'COPTERS

Ability of helicopters to haul supplies and troops to areas heretofore accessible only by foot or animal pack has tremendously increased the mobility of infantry. The "whirlybird" has, on occasion, even hauled hot chow to troops in isolated positions. Perhaps its greatest reputation is as a flying ambulance. Further to increase its use in this connection, plans are completed for helicopter ambulance units to operate integrally with foward medical facilities.

Already in operation are three helicopter transport companies, equipped on an interim basis with utility type machines. These, plus additional planned units, will receive cargo types as they become available, on the basis of 21 cargo and two utility helicopters per company. Eventually, the companies will be organized into battalions and assigned to field armies.

The XH-26, a one-man pulse jet helicopter, first flown in June, 1952, is now undergoing additional tests. Army is also interested in development of a "convertiplane" an observation-reconnaissance craft that can take off and climb vertically but fly like a conventional plane.

ATOMIC WEAPONS

In addition to improving the more standard weapons, the potential of the atom is being added to Army firepower. The Army now has the prototype of a highly mobile, heavy artillery gun capable of firing both conventional and atomic projectiles for tactical support of field armies. "Atomic artillerymen" are being trained to use it.

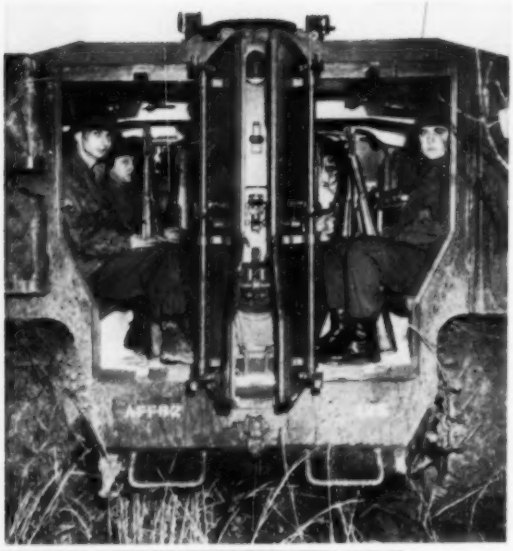
"This newly developed atomic gun," Secretary Pace recently explained, "can give the ground commander tremendous firepower at his finger tips and directly under his control. Like conventional artillery, it would be especially effective in defending against attacking ground forces obliged to mass and expose themselves in an assault. Unlike piloted aircraft the atomic gun can function in all weather, night or day. It is essentially an artillery piece—but with immeasurably greater power than any artillery hitherto known. Carried on a platform suspended between two engine cabs at front and rear, this highly mobile atomic weapon can travel at a speed of about 35 miles per hour on highways. Weighing about 75 tons, it can cross bridges which Army engineers are already trained to build for present heavy divisional equipment. It can travel cross-country, and fits into a landing ship designed for amphibious operations. It can fire with accuracy comparable to conventional artillery and tests indicate it is more accurate at long ranges.

"To provide atomic weapons that can far outrange our atomic guns, we are developing guided missiles and rockets which may be armed with atomic warheads."

There are two categories of guided missiles in which the Army is interested and in which genuine progress is being made. One is the surface-to-surface missile designed to carry conventional and atomic warheads as super long-range artillery of great accuracy. According to General Collins, this weapon may some day supplement close-support aviation in rough country and in darkness or in stormy weather.

The other guided missile of interest to Army is the surface-to-air missile—an anti-aircraft weapon. Army hopes to provide a weapon system capable of rapidly and accurately engaging and destroying the modern high performance bomber.

As new weapons become available they are integrated into the existing pattern of firepower. Several guided missile units already have been activated at cadre strength. Surface-to-air guided missile units will replace regular



Mobility for the Infantry—to a certain point. *At top*, a squad advances in an armored Infantry carrier. *Below*, the ride is over, and the squad proceeds via shank's mare. Carrying 12 men, the 20-ton armored carrier protects spearheading infantrymen from small arms fire and shell fragments as they go into combat. Carrier is also used as cargo or litter carrier, prime mover for towing artillery or as command car.

anti-aircraft battalions while surface-to-surface guided missile battalions will be organized in lieu of field artillery battalions.

SOLDIER GEAR

As part of a long-range program to decrease the load of the individual soldier, light-weight recoilless weapons capable of firing high explosive and anti-tank ammunition are under development. A base plate for an 81-mm mortar recently fabricated from pure commercial titanium weighs 24 pounds compared with the 45-pound steel plate now in use.

High on the list of new Quartermaster Corps developments is the sealed, insulated, rubber combat boot —use of which in Korea this past winter reduced cold weather foot injury almost to the vanishing point—and the insulated casualty evacuation bag for protection against extreme cold during medical evacuation. A new helmet will save eight per cent in weight and give 15 per cent more protection.

Combat troops in Korea are equipped with the latest armored vests. Army is continuing efforts to reduce the weight of the new item, to afford a higher degree of protection, and to further reduce interference with the soldier's job as a fighter.

In the clothing line, work is being rushed on a new winter uniform which may eventually replace the more complicated ensemble now issued troops in wet-cold climate. Called the coldbar suit, it is made of a new, experimental foam-plastic material and is based on the vapor barrier principle.

A fast-moving, hard-hitting Army demands the most rapid means of control. This the Signal Corps has provided in a newly integrated communications system including everything from a lighter and more powerful handi-talkie radio to portable switchboards and teletypewriters.

DIVISION BALANCE

Of the three functional groups of an Infantry division—(1) command (2) combat (3) service —the combat elements are by far the largest. They include the assault, reconnaissance, and combat-support units. Seventy per cent of the men in combat elements are assigned to assault units—the three Infantry regiments, the reconnaissance company, the Engineer combat battalion and the tank battalion. Twenty-five per cent are assigned to the combat-support units, which include division artillery, anti-aircraft battalion and signal company. The remaining men in a division fall into either command or service groupings which consist of the medical battalion, the quartermaster company, the ordnance maintenance company, the replacement company, the military police company, and the headquarters company.

Army has found through long experience that these three groupings in proper proportion create a well-balanced fighting team. The success of a division in carrying out its assigned combat mission is dependent upon the coordinated efforts of all elements. Failure of any one can

result in failure of the division to accomplish its mission.

The service elements of a division are important because of the "staying power" they provide. They make it possible for the division to engage independently in sustained combat for a long period of time. They increase its ability to hold ground and to engage in prolonged combat. With its replacement company, for example, the division can absorb and integrate replacements while fighting and thus maintain its combat power.

SOVIET COMPARISONS

Comparison with a Soviet infantry division, which has more combat troops from a given amount of manpower, points up our advantage. In general, Soviet infantry units are armed with more mortars and heavy machine guns than corresponding U.S. units. However, these units are provided with proportionately fewer vehicles for transportation. In addition, most weapons crews are much smaller than crews of corresponding U.S. weapons, a discrepancy particularly noticeable in the number of personnel designated as ammunition bearers.

While these characteristics make the Soviets strong in the static defense of a position or in a slow-moving situation, they are highly unfavorable to a war of movement.

Furthermore, due to poor communication and control and undeveloped techniques of fire direction, the Soviets are limited in their ability to employ their weapons and manpower most effectively. They are particularly weak in the ability to mass firepower in unexpected situations.

As for organic logistical support—it is far less than in a U.S. division. Soviet infantry divisions have only about one-fourth the medical personnel of their American counterparts, a fact which decreases the chances of a sick or wounded Soviet soldier to survive. Quartermaster, ordnance maintenance, and military police services are few or non-existent. Personnel services are at a minimum. If a soldier dies or is wounded, his family is not notified. There is no replacement company. All of these deficiencies seriously impair the ability of the Soviet division to sustain itself in combat.

At top, gunners of the Third Battalion, 23rd Infantry Regiment, Second Infantry Division, blast communist positions on a Korean hill with fire from a 57mm recoilless rifle. *Center*, neither snow nor cold nor din of battle stays efficient operation of that great morale-booster, the Army Post Office. *Bottom*, war has its heroines and its heroes. An Army nurse instructs technicians in ward techniques in the field.

The Army's newest weapon, the 280mm "A" gun, fires both conventional and atomic projectiles. *Left*, a dummy round is automatically locked and loaded into the chamber. Crew of five men merely push buttons and aim the weapon. Independently contained generator provides power for elevating, traversing and loading the weapon. *Below*, the new gun moves on its special transporter, consisting of two truck-tractor type units, with the carriage and mount supported between them.

This fact, it should be noted, is a necessary part of Soviet doctrine, which stresses mass and momentum—mass achieved through commitment of force in large numbers without regard to casualties, and momentum achieved by employing forces in waves, each succeeding the other as soon as the forward movement bogs down.

Here, then, is the underlying difference in make-up of the two divisions: whereas the Soviet is an exponent of mass achieved through sheer weight of manpower, the U.S. is an exponent of mass in the sense of combat power.

IMPORTANCE OF THE INDIVIDUAL

In recognition of the importance of the individual soldier in modern war, a constant effort is made to improve his well-being, preserve his dignity and enhance his morale. Assisting in this task, Army has a Human Resources Program, which studies and makes recommendations concerning every aspect of "human engineering" from personnel selection and classification to psychological problems caused by the dangers and discomforts of combat.

Probably the most impressive advances in behalf of the individual have been in the field of medicine and in the efficiency of medical practice. The best index is the survival rate of the wounded who reach battalion aid stations. In World War II, 955 out of every thousand recovered—an increase of 35 over World War I. In Korea the figure has been raised to 978 and, of this number, 846 have been returned to duty.

Partly responsible for this achievement are the uses of whole blood and blood plasma, and the use of plastic plates as "skullcaps" to replace less satisfactory metal plates for serious head injuries.

The battle against disease, the greatest loss-producer in war, also is gaining ground. Deaths occurring among cases admitted for disease in the Far East Command have been reduced to slightly more than one-tenth of one per cent, and 96 per cent of all cases

Indoctrination in atomic warfare is a phase of Army training. Troops of the 11th Airborne Division take part in exercises at Yucca Flats.

of disease and injury have been returned to duty without leaving the theater. One of the most remarkable advances has been in the testing of primaquine; early studies indicate that it effectively eradicates malaria in the majority of cases.

STUDENTS IN ARMS

An increasingly important contribution to the soldier's welfare is being made by Army's Troop Information and Education Program. Assisting in the effort are some 450 Army newspapers and 69 overseas radio stations. Though some of the newspapers —like "Stars & Stripes"—are printed on modern rotary presses at theater headquarters, others are mimeographed in the field. Typical of the latter is the "Buffalo Bugle," published daily on the Korean battlefront by the 17th Infantry Regiment. The paper has gone to press by candlelight and flashlight, in bombed-out buildings and in open fields—but so far has never missed an edition.

The "educational" part of TI&E offers to all soldiers an opportunity to participate in educational programs ranging from first grade through college.

When fighting in Korea was raging at its height American servicemen sent to the rear for rest could be observed quietly at work in a three-car train stopped near the 38th Parallel—a military version of the little red schoolhouse and college campus combined. With the help of this mobile school and other facilities, by end of 1952 more than 30,000 soldiers were taking one or more courses.

In its drive to raise the academic level of the Army, a particular effort has been made to eliminate illiteracy. Last year 43,870 soldiers were given either fourth or fifth grade certificates. In addition, 6,235 received eighth grade certificates, 46,046 completed the equivalent of a high school education, and 8,405 completed the equivalent of one year of college.

ROTATION

Undoubtedly one of the biggest morale factors in the life of the fighting man in Korea is Army's rotation policy. By end of June 1952, the Army had returned over 300,000 soldiers from the Far East. This is the first time in our country's history that systematic rotation of combat soldiers has been carried on during large scale fighting.

TRAINING TO BE A CIVILIAN!

The citizen-soldier character of our Army results in the constant induction and discharge of personnel. The soldier, literally, is here today and gone tomorrow. Faced with this fact, the Army feels its responsibility for maintaining and improving the effectiveness of the citizen while he is in service.

Soldiering is definitely more complicated than formerly. Mechanization, electronic control, and radar are a few of the things that have changed the face of war and the look of the Army. Individual skills have become more specialized, as new weapons and more intricate equipment have come into use. Today, as a result, in addition to eight weeks of basic combat training, each male trainee receives six to eight weeks of specialist training.

The average soldier leaving the Army today has had opportunity to exercise leadership while still a young man. The poise, confidence, and experience thus gained have positive value when he rejoins his civilian community.

He should leave the Army a more mature and understanding man. Every job he does—be it fighting the Chinese communists in Korea or standing guard at the international crossroads of Berlin—demands courage, ingenuity, hard work, creative thinking, and perseverance.

TRAINING TO BE A SOLDIER

Training of recruits to fill the ranks and maintain a steady stream of replacements for rotated personnel is another of Army's never-ending tasks. In the last two years more than a million new men have been trained. To train the approximately 665,000 new replacements entering service this year the Army is, of necessity, being turned into a huge training plant. Even units of the general reserve charged with maintaining combat readiness must carry part of the load.

The Army has greatly intensified the practicability and realism of its training. Returning veterans from the battlefields are utilized to the maximum in training centers to emphasize and pass on valuable experience learned in combat.

Because Army must be prepared to fight under all conditions of terrain and climate, training for guerilla, arctic, winter, jungle, mountain, desert, and amphibious warfare continues to receive emphasis.

Since today's soldier is also faced with the possibility of atomic weapons in future war, the subject has been incorporated in all phases of training from the individual rifleman to Army staffs. Realistic indoctrination in atomic warfare is gained in the tests conducted by the Atomic Energy Commission at the Nevada Proving Ground. Approximately 10,000 individuals were indoctrinated in 1952.

LOGISTICS

Supplying Army's world-wide force with everything required is an enormous undertaking.

The length of supply lines—5,000 miles to Korea, 3,000 to Europe—is a problem in itself. Troops in Korea require an average of one ton of supplies per man per month and the composition of this tonnage varies widely from season to season. To insure that the pipeline is always full and that the fighting man never has to "do without," supply planning must be detailed and continuous.

THE BATTLE TO SAVE

Fully aware of the cost of its upkeep to the American people, the Army is conducting an all-out compaign to cut down military expenditures. This fight extends to every facet of Army life, and to date impressive results have been achieved. Over $8 billion has been saved by rehabilitating World War II equipment and rebuilding junk from the scrap heap. A program to conserve scarce materials through substitution of less critical materials saved, in the last three months of 1951 alone, more than four million pounds of copper, more than 850,000 pounds of natural rubber, 95 thousand pounds of wool, 122,000 pounds of aluminum, and 200,000 pounds of zinc.

Thus from conservation of human resources to conservation of natural resources the Army record of service runs since the infancy of American freedom. Today Army can claim in confidence that, despite its multiple tasks, its central theme of fidelity to the United States permeates each task. END

ADMIRAL WILLIAM M. FECHTELER

Chief of Naval Operations

To date, the American Navy has been able to cope with the towering demands of the times. In Korea, the Navy has ferried, landed, supplied, protected and supported our forces during thirty months of exhaustive fighting. From the Mediterranean to the China Sea, the Navy has demonstrated our good faith and readiness to guarantee freedom. In the Western Hemisphere, the Navy has stood as one bulwark against threats to our homes and neighbors. In scientific realms, the Navy has kept pace with the advance of weapons and weapon defense.

The Navy's position is not the result of chance but is a compound of foresight and industry put forth since World War II. Our scientific researchers developed new weapons and techniques. Our fighting forces trained earnestly. Our Reserves put on uniforms and turned to with a will. Our mothball ships and planes were ready and were used. Our citizens paid the bil' with sacrifice and resolve.

However, we dare not rest content with yesterday's accomplishments which have yielded today's results. International stability can vanish with the explosion of a single adroitly-placed bomb or the death of a single highly-placed individual. The invention and refinement of the deadlier devices can alter day-by-day tactics. For these reasons, an effective Navy can never be static. Ships, planes, weapons and training must meet every challenge of the future. The American people can be assured the Navy intends applying every effort in this direction. In turn, the Navy trusts in the understanding and support of the American people to provide it with the men and the means for exerting such effort.

W. M. Fechteler

THE NAVY

Seapower has shaped American destiny significantly. Thus today, with our future enmeshed with that of people across the seas and the cost of arms unbelievably high, every American should understand seapower, the mission of the Navy, and how the mission is executed.

The way seapower looks to an individual depends on where he stands in time and space. To George Washington at Yorktown it was a tactical weapon—the French Fleet—which he used to coop Cornwallis. Abraham Lincoln visualized seapower as blockade and close support of troops ashore. Teddy Roosevelt, squinting beyond the horizons, saw it as a diplomatic influence extending to the shores of Europe and Asia. World War I generals considered it as a bridge for men and materials to Europe. World War II global strategists envisioned seapower as a mantle of might covering the seven seas from ocean floor to upper air.

Today, the citizen of a democracy fringing the Iron Curtain views seapower as a safeguard to his freedom. The communist glowers at it as a frustrater of his aggressive schemes. Even the small boy has his picture of seapower in such real-life wonders as Navy's 1,200-mile-per-hour *Skyrocket* or the killer submarine *Grouper* dueling in the depths. And the taxpayer, every 15th of March, eyes seapower as one cause of his tax burden.

Seapower really is in all these pictures. So let's look now through the eyes of the American who wants to preserve his homeland's security. He sees real security only if the aggressor is kept off his doorstep, and only if his own reach is long and strong enough to slap down that aggressor. How is he going to meet these conditions? In great measure by commanding the seas. So there's our definition of seapower — "command of the seas". There also is what seapower does—keeps the foe out of our yard; gives us capability to stop disorder when it threatens elsewhere.

The sound and the fury of war! The *USS New Jersey* fires a salvo of 16-inch shells into an enemy stronghold near Kaesong, Korea.

In scope, the business of gaining sea control is like leading an orchestra—the direction of numerous instruments in concert. Such instruments include formidable combat ships, a superior naval air arm, a big-bellied merchant marine, an effective air lift, and a mobile ground force.

The Navy's job is to provide the naval forces required in the concerted effort to control the seas. Ownership of such naval power serves four vital ends.

1. Deters Aggression

The presence of an American fleet in the Mediterranean has been a big factor in discouraging encroachment by communism in areas bordering the Mediterranean. Formosa certainly would have fallen to Red China but for the pressure of a U. S. Navy task force. Would-be aggressors pause before marching because war means automatic exclusion from the sea; instant and crippling blows from carrier air power.

2. Inspires Free Nations

Free Italians, fighting Greeks and friendly Turks have all been cheered by the sight of American naval vessels. The American flag on a warship abroad is a tangible symbol of hope for the oppressed.

3. Prevents Spread of War

Brush fires won't spread across water when proper naval power monitors that water. Britain's Navy, keeping invaders from her shores since Norman times, is the classic example. Korea is the contemporary instance. The Reds have been held to the one battle ground, Korea itself, while United Nations' naval force moves at will around the Asiatic coast and across the Pacific.

4. Contributes to Victory in All-Out War

A requisite for winning is preservation of industry. Modern war is big and complicated. When we can safely, swiftly and efficiently produce a continuing stream of

weapons we hold vital advantage. A strong Navy builds a barrier which stops the enemy from ravaging the vitals of industry. The Navy also guarantees delivery of weapons and men. As a complement, naval power permits import of crucial raw materials. The obverse must be the capability of muscling the foe off the sea lanes, forbidding him essentials of industrial mobilization and movement of his own forces by the easy sea road.

A Navy is a participant in combat itself. Drive the enemy from the oceans in whatever guise assumed—plane, submarine, ship or mine. Furnish punch for seizing bases and beach-heads, severing land communications, knocking down enemy air. Support a land or air campaign in any way the high command sees fit.

Naval power is applied by the physical manipulation of the Navy itself. The principal functions are fourfold:

1. Master the Sea

This is partly a blue water job—destroy opposing naval forces, suppress enemy maritime commerce, control sea lanes, seize advanced naval bases. It also involves land and air operations which win the naval campaign.

Any threatening enemy air or naval base, even though far inland, will be attacked with high-performance carrier aircraft which can utilize the atomic bomb.

Also contributing to mastery of the sea are naval reconnaissance, anti-submarine warfare, ship protection, mine laying, mine sweeping, naval air transport and sea-based air defense.

2. Fight Amphibiously

This requires providing naval forces, including naval close air support forces, for amphibious landings.

Here, the Marine Corps is a sturdy component of naval power. Marine Corps and Navy train to work with and for one another in any campaign where sea and land fighting commingle.

3. Defend Home Soil

Navy also shares in the defense of the continental United States against air and seaborne attack. Ships, planes and submarines far at sea form a screen to detect and destroy hostiles of whatever type.

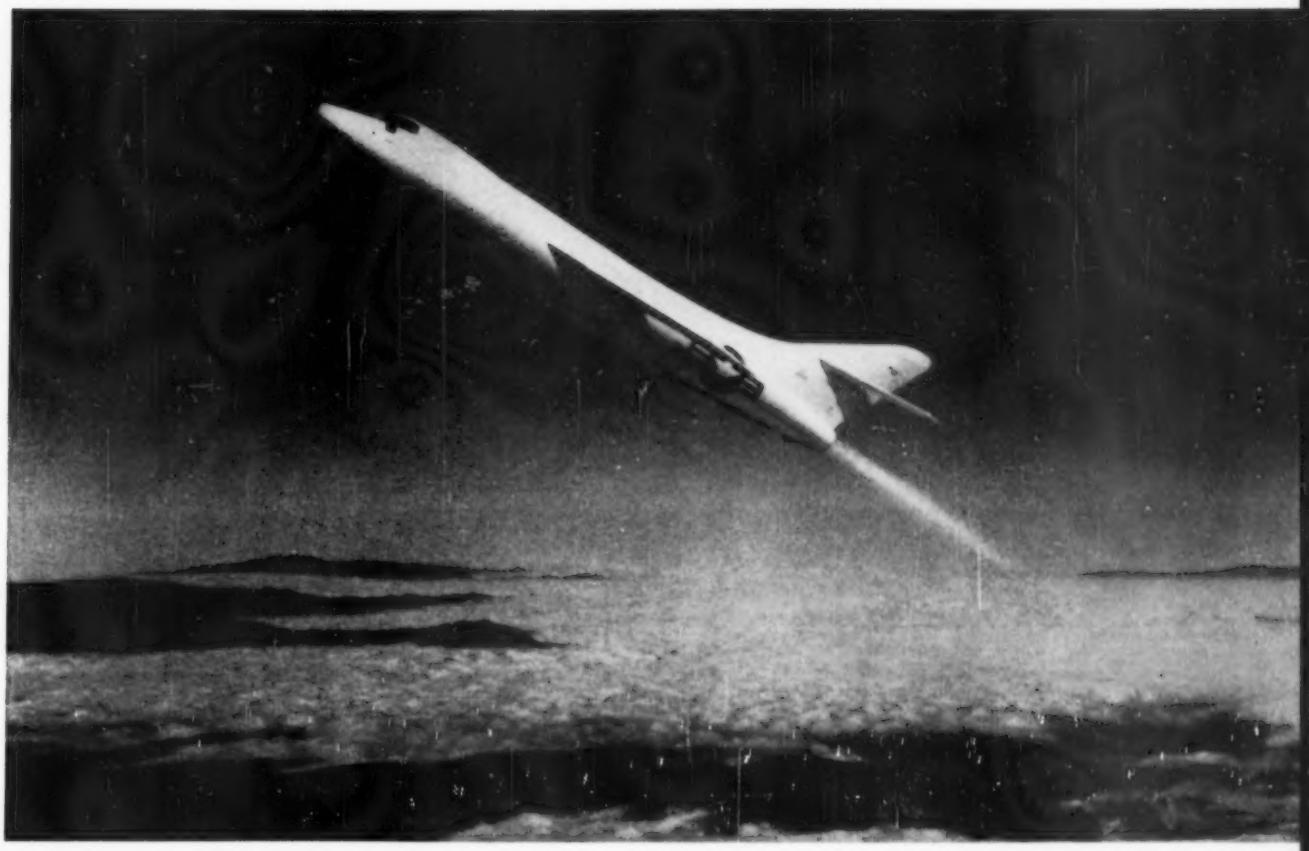
4. Support Sister Services

The Navy stands ready to support Army and Air Force in overseas struggles. This has happened repeatedly in Korea where Navy ships and carrier aircraft have mauled Red forces and communications ashore, have given close air and gunfire support to infantry, photographed inland terrain, participated in air strikes against enemy factories, power plants and dams, and landed troops in contested territory.

If all-out war erupted, the Joint Chiefs of Staff could direct the Navy air arm to join in toppling enemy industrial complexes—and not necessarily in coastal communities. The carrier bomber shepherded by its own jet fighters packs an atomic punch for hundreds of miles inland.

Manifold duties of the Navy require diversification and quantity in ships and weapons. On one end of the scale is the new 59,900-ton carrier *Forrestal* nesting planes of

The Sixth Fleet in the Mediterranean discourages Red encroachment there. *Below*, McDonnell F2H2 *Banshees*, in formation over the *USS Coral Sea*.



Modern seapower encompasses such spectacular weapons as the Douglas D-558-2 *Skyrocket*, clocked at more than 1,200 mph at a 79,494 ft. altitude.

supersonic speed. On the other, is the lonely swimmer with a dynamite charge tucked in his belt stroking noiselessly ashore at two miles per hour. Between the carrier and the man are battleships, cruisers, destroyers, submarines, transports, landing craft, and aircraft. To man and maintain this fleet are three-quarters of a million uniformed Navy folk. To support it is an extensive network of bases, dockyards and stations.

Navy men are fond of the term "well-rounded" and it has special significance for tactician and strategist. All the world's ocean, from poles to tropics, is a potential battlefield, and with the wide variety of jobs to be done and threats to be countered, the naval leader always considers the composition of his forces for any given task. And that's not simple. An expedition may be required to battle submarines for several thousand miles of cruising, beat down attacking aircraft, sink interfering enemy ships, hammer shore defenses, deliver an amphibious assault and finally stay on station to offer follow-up support; the while successfully battling mines, guided missiles, weather and various infernal contraptions, perhaps atomic.

Warfare today seldom matches opponents by tournament rules. Rather it's like the Roman arena where men with assorted weapons fought tigers or panthers or whatever popped out the door. Weapons vary from a radio-loudspeaker putting forth the propaganda of a Lord Haw Haw to the blast of an atomic bomb.

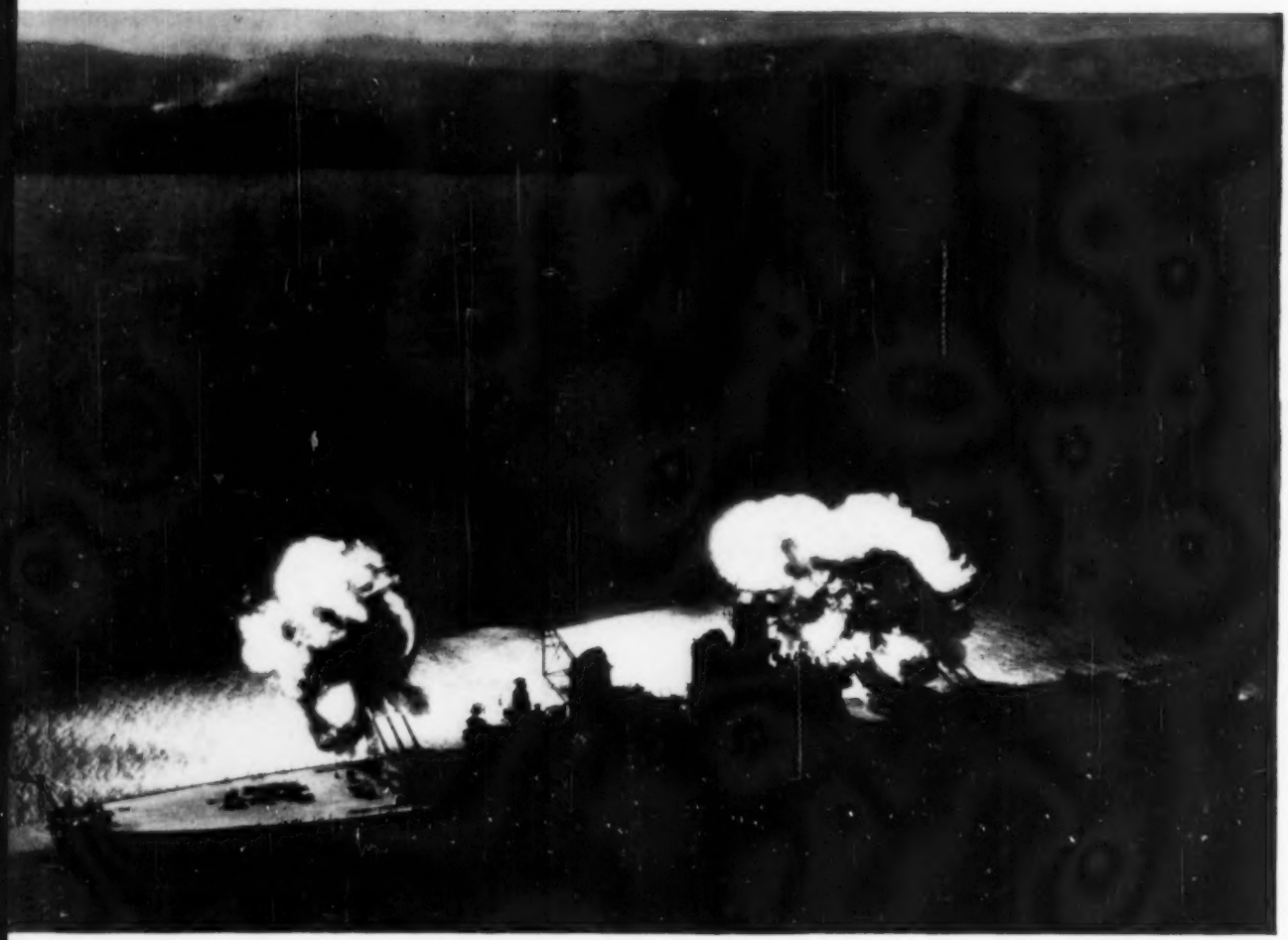
"ESTIMATE OF THE SITUATION"

A careful assessment of own and enemy strength, combined with an analysis of the task, tells the kind and quantity of seapower to utilize. Navy accomplishes this by a searching "estimate of the situation" from which is derives a campaign plan and *task organization*. For the largest endeavors, a *task fleet* would be used; for lesser missions *task forces*, *task groups* or *task units*. The best known is the carrier task force of World War II, an array of carriers with supporting battleships, cruisers and destroyers, comprising several task groups. But it is not necessary that a fighting team consist of hundreds of ships —it may be only one as in the case of the destroyer *Burns* which steamed into the night off Kwajalein in 1944 and sank four Japanese ships. Further, a task force has the making of other types of force within its ranks. Battleships, cruisers and destroyers may peel off to engage enemy surface fighters or bombard beaches; a carrier and destroyers may break off to hunt and kill submarines.

Even if the enemy owns no comparable fleet, nor any fleet at all, it is still mandatory to maintain a large and diversified force of one's own. In the Civil War the North commissioned 1,069 vessels as against 212 in the Confederate Navy. The overwhelming superiority was essential to stifle the South with blockade.

Again, by the time of the Okinawa campaign in 1945, the Japanese Navy was reduced to less than 100 men-of-war, yet 318 American combatant ships, 1,139 auxiliaries and myriads of landing craft were required to take and hold the islands.

In Korea today, the Chinese and Red Korean navies are practically non-existent yet nobody argues against the need for large and modern task forces. Our carriers have roamed at will north of Parallel 38. Their planes, with



Close aboard hostile shores, the modern battleship can slam out nine 3,000-pound shells every 27 seconds—and keep at it relentlessly.

but short hops to the target, have delivered heavy bomb loads and their fighters, with plenty of fuel, have remained on station for hours. Battleships, cruisers and destroyers have sailed close aboard hostile shores delivering bombardments for days at a time. Such pummelings are immensely valuable. A battleship can slam out nine 3,000-pound shells every 27 seconds and keep at it. The amphibious forces, carrying 13,000 Marines to Inchon, cut off some 80,000 Reds who held over 33,000 square miles of South Korea.

diversification is also essential, as the Germans learned tragically when they twice gambled for sea control with a lop-sided Navy full of submarines.

WELL-ROUNDED FLEET

Several advantages accrue to our well-rounded fleet. First is readiness. Whether a full war or another brush fire ignited today, planes on our carrier decks are ready to fly missions in the time required to fuel and arm them, about 12 minutes in World War II and better than that now. There is no place within several hundred miles of navigable waters in the Far East or Europe that is not within assault range of carriers already on station.

Readiness is also measured in terms of physical reserves. A ship, once built, lives a fighting life of a score or more years. The expansion of the pre-Korea Navy

The *USS Pickerel* surfaces from a depth of 50 feet with a 48° up-angle. Active U.S. submarines number 105, with a nuclear-powered sub on order.

"Après moi, le deluge," might well be the motto of the Navy's Douglas AD *Skyraider* pilot, pinpointing aerial torpedoes on a key Korean dam.

from 238 ships to its present combatant strength of 572 was accomplished with the construction of only 10 new ships. The rest were World War II mothballers with modern improvements. Over 3,300 planes were shaken out of mothballs.

Versatility features in the well-rounded fleet. The carrier task force can fight at sea against opposing ships, submarines and planes. It can reach far over land with atom bombs too. It can back up troops in amphibious assaults and sustain the assistance even when the fighting is inland. It can fight on the Arctic Circle or the Equator, in mid-ocean or within sight of the beach.

Mobility contributes vastly to fleet effectiveness. Potential strength multiplies because fighting ships on our East Coast can be transferred intact to the Mediterranean in five days. Any aggressor must measure our strength not only in terms of what we have at the starting line of war but what we can concentrate within a few days.

This same mobility dissipates the opponent's defensive strength. A carrier task force could strike Boston, New York and Philadelphia simultaneously in the morning; Washington, Pittsburgh and Norfolk in the afternoon; and 43 hours later rampage along our Gulf coast from Miami to Galveston. The Bostons, New Yorks and Washingtons of our foes may expect just such treatment from the American carriers.

The element of surprise which attends mobility not only puts the enemy on a nerve-wearing, resource-exhausting alert but reduces chances of attack against our fleet. A carrier task force occupies approximately 100 square miles of ocean, yet it can strike anywhere in over a million square miles—equivalent to all the United States east of the Mississippi. Once having struck, it can, if it wishes, be as far away in one day as is New York from Chicago.

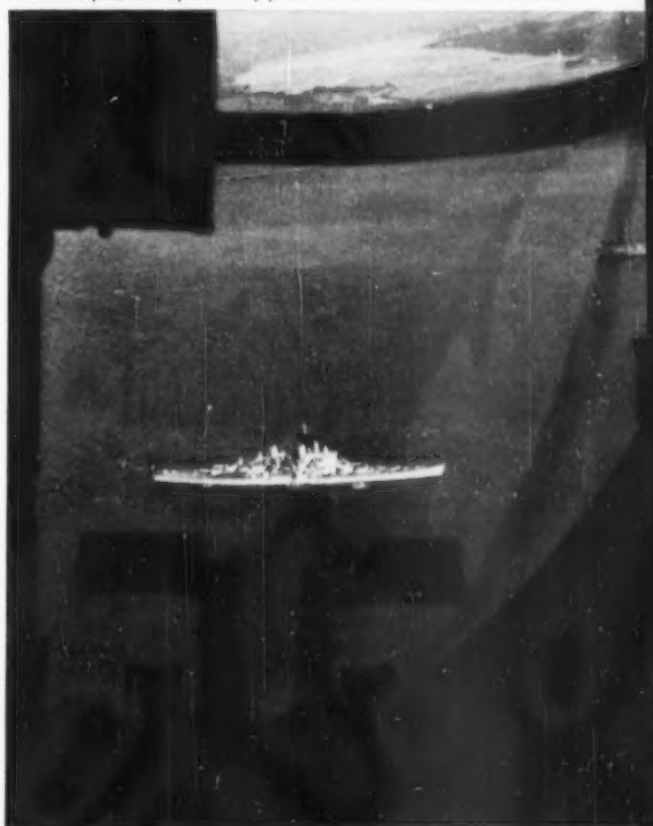
Mobility is dimensioned in both space and time. If an enemy raids a land air base, he picks his own time and knows exactly where the target lies. If he attempts to hit a carrier group, he must arrive at a place which is variable and at the exact time the carriers occupy that place. A tough problem. If he should be lucky enough to gain bomb-range contact, the fleet's mobility again asserts itself to his disadvantage. The carriers and defending ships slide into a formation which facilitates protective air operations, gun defense and evasion.

These advantages are not confined to the carrier. Any mobile seaborne weapon likewise profits. The submarine, which stealthily approaches an enemy coast to launch guided missiles or sow deadly mines, is an example. The amphibious force which, unlike a land army, shrouds its movements in the bigness of the ocean, can strike anywhere at any time with little or no warning.

The well-rounded fleet is economical, too, in the total-war sense. This characteristic manifests itself in the fleet's ability to control the sea lanes. The enemy cannot deliver persistent and devastating blows because he cannot close his targets. Thus, while the inferior seapower suffers severe damage, home industry continues without fatal loss of war-wrecked plants.

Again, with an eye to savings, the master of the sea ignores long distances. Once a ship is loaded with troops and munitions, the cost to drive it 10,000 miles is little

Seen through the nose of a helicopter, a battleship rides at anchor in the Firth of Clyde, convoy assembly point for NATO's Exercise Mainbrace.



more in terms of investment than the cost to drive it 1,000 miles. Homer Lea, the early 20th century Pacific analyst, suggested that the Japanese might carry a whole army from Japan to San Francisco as easily as to China. But it was America which built the bridge of ships across the Pacific.

PROTECTION OF SUPPLY LINES

Finally, the thrifty custodian of sea supremacy cannot only support his allies but can transport raw materials to his own factories. Look at the trifling trade between Germany and Japan in World War II—a few furtive submarine voyages, exchanging cargoes that measured no more than 190 tons each (and sometimes ended up on the ocean's bottom). Meanwhile, chromium, manganese, tungsten and tin arrived by the shipload at our shores and we in turn supplied Russia and Britain with mountains of war goods.

Lack of these same raw materials which flow so easily to the nation with seapower strain the foe to the limit in manufacturing substitutes. Germany invested extravagantly in ersatz fuel development and refining. The United States spent frantically inventing synthetic rubber processes and building factories after Japan seized the East Indies. Recent surveys prove that the United States has already moved into the have-not side of the ledger as raw materials go and it becomes a matter of survival to protect channels linking foreign sources.

The Navy's tools are built to provide maximum security at minimum cost. Their number, physical characteristics and employment conform to this mandate.

Here's what we have today:

CARRIERS AND THEIR PLANES

The spearhead of our carrier power will be the new *Forrestal*, a 59,900-ton flush-decker, ready in 1954. She fills the urgent need for a flattop which can base bigger, faster planes, store sufficient jet fuel and ordnance, catapult modern fighters, and withstand terrific punishment. One sister ship has been authorized and the Navy's goal, under present world conditions, is an orderly building program of one or two each year.

Until the *Forrestal* takes to the sea, the carrier queens remain the 45,000-ton *Midway*, *Roosevelt* and *Coral Sea*. Of the veteran 27,000-ton *Essex*-class carriers, 11 are active, nine of which have been modified for jets with sturdier flight decks, stronger catapults, bigger fuel and ordnance storage. Five elderly light carriers, such as the *Saipan* and *Bataan*, and 10 "jeeps" or escort-carriers can be utilized for anti-submarine piston-engined planes and as cheap trans-oceanic airplane transports. Carriers standing by in reserve are 14 *Essex*-class, three light and 51 jeeps—all products of the last war's program.

Until we are stronger in first-line carriers, there will be justified concern amongst naval leaders. The carrier is still a comparatively new weapon. Improvement in carrier design must be pressed.

Jet fighter planes in service are Grumman's *Panther* (F9F5) and McDonnell's *Banshee* (F2H). The Douglas piston-engined *Skyraider* (AD) is the all-purpose, carrier attack plane whose bombs, rockets, and torpedoes have made deep impressions on the map of North Korea.

Frogmen of the Navy's underwater demolition units are a "secret weapon" in the amphibious invasion of hostile shores. There is no special rating for the Frogman, who may be a cook, yeoman or medic, for instance, in addition to his demolition chores. Rubber clothing is cloth lined and covers heavy underwear for protection against icy waters. At left, his mission accomplished, a Frogman is "snared" aboard a rubber craft secured to the side of a landing barge. Method enables the barge to proceed at speed during pick-up operation.

Gymnastics are in order as a crewman aboard the *USS Franklin D. Roosevelt* catches a helicopter blade to secure it by canvas hood to the deck.

Vought's *Corsair* (F4U) hauls a share of both bombs and bullets. Grumman's *Guardian* (AF), is carrier air's current locator and liquidator of submarines. The aging *Avenger* (TBM) is still touring with the carriers as another sub killer.

There are enough carrier planes to fill the decks of all our carriers from the 130-plane CVB's on down. The big problem is to keep them modernized and at the same time build a reservoir of manufacturing potential—the so-called "broadening of the industrial base." Unit costs are five times what they were in World War II while the Navy's pocketbook is comparatively slender.

Among new fighters which are or will be making their appearance on carrier decks are North American's *Fury* (FJ2), Grumman's *Cougar* (F9F6), McDonnell's *Demon* (F3H-1), Douglas' *Skyray* (F4D), and Vought's *Cutlass* (F7U-3). In the attack-plane field is the Douglas turbo-prop *Skyshark* (A2D), and the Douglas twin-jet A3D.

Development focuses on high performance planes which can defeat or evade any interceptor. Fortunately, these aircraft can be high performance because they do not need long range—the long range is built into the carrier itself.

SURFACE FIGHTING SHIPS

In commission are four battleships, 19 cruisers, and 244 destroyers with 11, 54 and 103 each in the Reserve Fleet. One battleship, the *Mississippi*, is being rigged as a guided missile platform and two cruisers, the *Boston* and *Canberra*, are undergoing similar alterations. Other ships boast significant modifications in armament to ward off air attack. The 3"/50 caliber automatic anti-aircraft gun is widely used, while 3"/70 caliber and 5"/54 caliber all-automatic guns are coming along. In fire control—the business of aiming to hit—electronic improvements promise unpleasant surprises to jet attackers.

SUBMARINE KILLERS

In the anti-submarine forces are the many-purpose destroyers and the carrier planes previously mentioned. In addition, 56 escort vessels sail with the fleet; 164 stand by in mothballs. Coming soon will be five destroyer leaders—one, the *Norfolk*, displacing 5,500 tons, the others, *Mitscher* class, 3,650 tons. These ships will mount the latest in anti-submarine ordnance and detection gear.

Operating in the Fleet are composite hunter-killer teams—carriers and destroyers—all specialists. The World War II submarine feared, most of all, an attack from another submarine. In a future war this apprehension would be aggravated by the new killer submarine, an underwater counterpart of the fighter airplane. So far, the Navy has three.

Multi-engined patrol planes, operating from advanced bases or anchorages, also threaten submarines—or any enemy sea or air craft that shows on the air search radar. These planes are admirably adapted to finding and trailing submarines and their anti-submarine attack techniques and weapons make them a dangerous foe of the undersea boat. Such planes are Martin's *Mercator* (P4M),

Mariner (PBM) and *Marlin* (P5M); Lockheed's *Neptune* (P2V); and Convair's modified *Liberator*—the *Privateer* (P4Y). Of these, the *Neptune* is considered one of the most effective "single-package" submarine antagonists in the Navy's arsenal.

While the jets strive for speed and more speed, the helicopter and the airship spurn speed altogether. Sikorsky and Piasecki hovering 'copters grab on and cling to submarines like pilot fish to sharks until they have conned a ship or attack plane's weapons onto the foe. The airship, a non-vibrating, roomy observation post, does the same. By fueling from surface ships, the blimps can squire a convoy across a whole ocean. Goodyear's ZPN, a larger, rangier blimp, is now undergoing trials.

AMPHIBIANS

In delineating amphibious forces, the Navy assumes that any vessel may assist in landing soldiers or Marines. However, an amphibious craft, in strict definition, is one concerned primarily with transport of troops and supply in waters immediately adjacent to the landing. Such craft today number 231 major vessels and 880 auxiliaries. Troop-laden helicopters flying from aircraft carriers are a significant and spectacular development.

SUBMARINES

United States submarine strength is measured at 105 boats. The last war dramatized the role of the submarine as a ship slayer but at the same time the undersea craft were laying mines, gathering intelligence, transporting troops, rescuing aviators, and reconnoitering for the big task forces. Expansion of all these subordinate chores into major operations may be expected in the future, as may the use of submarines to steer or launch guided missiles. The *Tunny*, *Cusk* and *Carbonero* are already operating as guided missile craft. A nuclear-powered submarine is presently building.

MINECRAFT

Mine warfare has been a sadly neglected topic in public discussion. Even the fighting men detest the business as dull, dangerous and unrewarding. The minelayer, risking his ship, submarine or plane in hostile waters, never has the satisfaction of seeing the pay-off "Big Bang." Nonetheless, the mine is a major weapon. The disarming of a German magnetic mine by British experts probably prevented the Nazi mine offensive of 1939 from winning a naval Battle of Britain. The Japanese grimly remember the havoc caused by mines in the Inland Sea.

If the laying of mines is dull and dangerous, the sweeping of them is equally as hazardous and thrice as tedious. Mines are everywhere and nowhere. The mere threat of them may cause a commander to alter a major plan. They cannot be ignored, as the evidence from Korea clearly shows—16 ships sunk against none lost by other causes. A nation weak in sea strength would be likely to choose the submarine-laid mine as one bid for victory—and a strong bid it would be.

Our mine force today comprises 115 mine layers and mine sweepers. Airplanes and submarines are also capable of detecting or laying mines.

SERVICES AND OVERSEAS TRANSPORT

The "secret weapon" is what they called the logistics force in World War II—a gigantic community of seagoing filling stations, groceries, warehouses, arsenals, and hospitals which nourished the fighting fleet for months of sustained operating. Today, the Mediterranean Fleet buys almost exclusively its food, fuel, stores and repairs from ships of the service forces. The Navy off Korea extends its on-station time in like fashion. These selfless auxiliaries can do everything from salvaging a sunken minesweeper to replacing a watch crystal.

Overseas transport for all Armed Services is the Navy-managed Military Sea Transport Service. While certain naval auxiliaries still sail strictly within the Navy, the old Army Transport Service, many naval "beef boats," and a host of chartered ships operate under the new "MSTS" which has been the primary carrier on the Korean run—over 53 million tons of cargo and three and a half million passengers in the first 27 months of the war.

An airborne "train" is the Fleet Logistics Air Wing consisting of over 200 planes operated by the Navy to serve the Fleet in instances and areas where the Military does not fly. These aircraft have an enviable record in helping carry the Korean load and they averaged a total of 211 flying hours per day in the Berlin air lift.

Training aerial gunners in marksmanship, with the aid of electrically geared guns firing at motion picture targets, is typical WAVE duty.

RESEARCH AND DEVELOPMENT

Although the entire Navy strives for improvement in means and methods, the program for research and development deserves special mention. The Office of Naval

A radar gunfire director, jutting amidships from the starboard side of the carrier *FDR*, controls the firing of anti-aircraft gun batteries.

Research explores exhaustively every new thought and revolutionary device. A special "Operational Development Force" maneuvers in the Atlantic and if anyone happens to see a face-lifted destroyer or odd-hulled submarine, the chances are it belongs to "Opdevfor." Scientists and inquisitive sailors conduct trials with realism—even to using live submarines as targets for new anti-submarine weapons. Last year an "Opdevfor" airship pilot won a Harmon prize for "towing underwater bodies." Aside from weapons, typical items which interest researchers are aviation psychology, cold weather lubricants, and the genetics of barnacles.

DISPOSITION OF FORCES

Thus, the tools of the naval trade. Their disposition is another urgent interest. The seagoing Navy is divided into fleets and forces predicated on international requirements, strategic considerations and training facilities. The big fleets are on the Atlantic and Pacific coasts, in the Far East and the Mediterranean. But today's traveler will likely sight American ships and planes in the Caribbean, the Central Pacific, Alaska, Northern Europe, and the Middle East—wherever a spot is tender. As to ships themselves, the fleets are fluid. Approximately every half year the Sixth Fleet in the Mediterranean and the Seventh Fleet in Asia undergo a nearly complete turnover, the reliefs steaming out from the home-based Atlantic and Pacific Fleets.

Administration and supply of the Navy is complex and weighted with terrible responsibilities. Not only the policy for today—whether to send another carrier to Korea, for instance, but the policy for the future—whether to use precious research funds for atomic research, must be uttered firmly and accurately. Hitler's decision not to push development of the V-2 rocket cost him dearly. Britain's judgment in building the *Spitfire* saved her plenty. Our own commitment to build carriers, lots of them, early in World War II undoubtedly shortened the conflict.

The burden of decision falls largely to the Chief of Naval Operations, senior commander in the Navy. He is advised by deputies and his material policies are administered by the technical bureaus (Aeronautics, Personnel, Ships, Yards and Docks, Supply, Ordnance and Medicine and Surgery).

Traditionally the Navy is under civilian control, answerable ultimately to the American people. Supervision and topmost policy is vested in a civilian Secretary of the Navy responsible to the Secretary of Defense and the President. Below them the system works like this: The Chief of Naval Operations determines what the Navy needs to carry out its mission. These needs are presented to Congress which gives consent in the form of appropriations. The Chief of Naval Operations then directs the technical bureaus to procure and deliver the goods from the nation's material and manpower resources.

The American citizen ordains the shape and actions of his Navy. Congress and the White House, properly sensitive to his opinion, regulate the Navy in accord with his wishes.

With the majority of naval issues, the voter is shrewdly correct in what he wants. The Navy recognizes that the man in the street who pays the bill, sometimes in dollars, sometimes in blood, deserves an accounting. Just how much security is purchased with multi-billion-dollar appropriations and the full-time services and personal risk of the men in uniform? In dollar terms, Navy property is today worth more than half the money invested in it since 1794. The Navy's deterrent and war-shortening functions have saved countless lives. It is reasonable to believe that but for the Navy and the sister services, Korea might have sparked World War III. Without a Navy capable of forcing its way across the Pacific, we might still be fighting the Japanese. Teddy Roosevelt described the Navy as the cheapest possible insurance. That still holds.

Few Americans note that our Navy, aside from its security mission, is integral to the people's welfare and economy. Shipyards, steel plants, and aircraft factories along with hundreds of other industries do business with the Navy. Medicine, electronics, aerodynamics and metallurgy are just a few of the sciences which have profited by Navy research and the stimulus of Navy needs. In education the Navy has contributed substantially. Ask a television repairman where he received his training and chances are he will answer "in the Navy." A Navy man has a choice of 63 trades when he ships in the service. In national leadership, ex-Navy men are also prominent. When disaster strikes, the Navy is always ready to lend a hand—California earthquakes, Mississippi floods, Maine forest fires and scores of other tragedies have been alleviated by the Navy.

There exist pitfalls in the ownership of a well-rounded fleet. First is the danger that it will not be built on a long-range basis. Nobody ever wins a war with blueprints. The blueprints must be converted into a finished and tested weapon before war starts. Americans hesitate in spending staggering sums prior to the outbreak of war. Yet if this is not done, modern engines of war may not be built in time. It takes 30 months to build a carrier. A lot of unfriendly bombs and bullets can go off in 30 months. We must have a continuing program of modernization and replacement.

Another possible hazard is untrained seafarers. The gadgets of war demand skilled operators, not embattled amateurs. An alert trained Reserve Corps is essential.

Finally, there is peril of public misunderstanding of what the Navy is all about. Having accepted a dominant position in the free world, we must hold fast to the control of the seas. This can only be done with the well-rounded fleet—there is no cheap or single weapon that can substitute for all-around naval strength. END

COMBATANT SHIPS

	Active	In Reserve	Total
Aircraft Carriers CVB	3	0	3
Aircraft Carriers CV	11	14	25
Aircraft Carriers CVL	5	3	8
Aircraft Carriers CVE	10	51	61
Battleships	4	11	15
Cruisers (All types)	19	54	73
Destroyers (All types)	244	103	347
Escort Vessels	56	164	220
Submarines	105	63	168
Minecraft	115	87	202
Total	572	550	1122

Ships under construction—113 of all types.

AIRCRAFT

Over 13,000 of all types

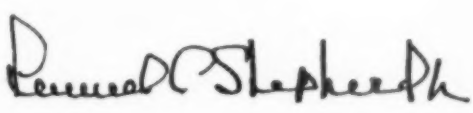
GENERAL LEMUEL C. SHEPHERD, Jr.
Commandant of the Marine Corps

The United States Marine Corps is now in its 178th year of existence, and we again have Marines arrayed in combat against those forces that would destroy the freedom of the world. The First Marine Divison and the First Marine Aircraft Wing, in Korea, are carrying their full share of our Nation's burden, the very reason for which our Corps exists.

The role of the Marine Corps in our National Security Establishment was reaffirmed in the law of our land during the year past, and with the passage of Public Law 416 go grave responsibilities and obligations which do not rest lightly on our shoulders. I have emphasized to all Marines that this show of confidence by the Congress and the people whom they represent is not an award for past performances of duty well done, but rather a mandate of the people to redouble our efforts toward improving the military efficiency of our Corps. I can assure you we are continually working toward those objectives.

A study of the tasks which may confront the Marine Corps in the future must leave the reader with the conclusion that the Marines have an almost impossible chore. It could be contended that not all the varied problems can be accomplished effectively. But such a conclusion is not sound, for these same problems, or variations of them, have been met and have been solved for over a century and three quarters.

God forbid that there shall ever be another world war. But if the war should come, the Nation's force-in-readiness, the U.S. Marine Corps, stands ready to carry out any mission that may be assigned in the defense of our country.



THE MARINES

News from Korea on the evening of December 7, 1950, was far from cheerful. The First Marine Division was surrounded near Chosin Reservoir by hordes of Chinese communists who had entered the Korean conflict. The Marine Commanding General had said that if weather would clear to allow close air support, they could make it to Hungnan where the fleet was waiting to evacuate them.

Air support arrived. The Division fought its way through the icy mountains to the east coast port. It has been said, "Seldom in the world's history have soldiers of any nation performed more gallantly."

Getting out of the communist trap was no accident—the Marine air-ground team was trained and ready for such an eventuality.

Less than three months before, the 23,000 Marines of the First Division had stormed ashore at Inchon and broken the back of the communists in South Korea. This was, likewise, no accident.

MARINE ORIGINS

One hundred and seventy-four years and 300 landings earlier, Marines had performed their first amphibious operation, when 300 of them landed in the Bahamas and captured military stores sorely needed by the Colonial forces.

Lessons learned through wartime operations and peacetime training since that March day in '76 have fixed the function of the Corps in the pattern of American security.

Although the forefathers of today's Marines fought as early as May 3, 1775, the Continental Marines legally came into existence on November 10, 1775, when the Continental Congress resolved, "that two Battalions of Marines be raised" and that "particular care be taken that no persons be appointed to office or enlisted into said Battalions, but such as are good seamen, or so acquainted with maritime affairs as to be able to serve to advantage by sea, when required."

Though few in number, the Marines performed notable service during the American Revolution; in several expeditions to the Bahamas with John Paul Jones; on the high seas in Continental cruisers; and with General Washington's Army in the Battles of Princeton and Trenton.

At the beginning of the naval war with France, the Marine Corps of today came into being. Since that date, 1798, by statute the Marine Corps has been an integral part of the Naval Establishment.

MISSION RE-AFFIRMED

The National Security Act of 1947 reaffirmed and defined the mission of the Corps. That act provides that the Marines shall be an integral part of the Navy Department, organized, trained, and equipped to provide Fleet Marine Forces of combined arms, together with supporting air components, for service with the fleet in the seizure and defense of advance naval bases, and for the conduct of such land operations as may be essential to the prosecution of a naval campaign.

The law further provides that the Marine Corps shall develop, in coordination with Army and Air Force, those phases of amphibious operations pertaining to the tactics, technique and equipment employed by landing forces. Other miscellaneous provisions charge the Marine Corps with security detachments for protection of property at naval stations and bases, furnishing personnel for duty aboard armed naval vessels and performing such additional duties as the President may direct.

BIGGER MUSCLES

An amendment to the 1947 National Security Act was

From the Halls of Montezuma to the snowbound hills of Korea—Marines!

"Airphibious" is the word! Leathernecks hit a front-line Korean hilltop by helicopter.

This Marine owes his life to his armored vest. He's removing a piece of shrapnel that lodged in the vest. The impact felled him, but the vest saved him.

passed by the Congress in the closing days of its session in July, 1952. This amendment, known as Public Law 416, provides that the Marine Corps shall be organized to include not less than three combat divisions and three aircraft wings, and such other services as may be organic thereto, and except in time of war or national emergency as declared by the Congress, the personnel strength of the regular Marine Corps shall be maintained at not more than 400,000.

Before this legislation the Marine Corps had no statutory organization but had its personnel strength established as a percentage of the Navy. As a result of Public Law 416, the Marine Corps is assured, for the first time in its history, of a division organizational structure. The 400,000 personnel ceiling does not support the thesis that the Marine Corps might be converted into a second land army.

Another section of the law provides that "The Commandant of the Marine Corps shall indicate to the Chairman of the Joint Chiefs of Staff any matter scheduled for consideration by the Joint Chiefs of Staff which directly concerns the United States Marine Corps. Unless the Secretary of Defense, upon request from the Chairman of the Joint Chiefs of Staff for a determination, decrees that such matter does not concern the Marine Corps, the Commandant of Marines shall meet with the Joint Chiefs of Staff when such matter is under consideration by them and on such occasion and with respect to such matter, the Commandant of the Marine Corps shall have co-equal status with members of the Joint Chiefs of Staff."

At the outset, then, it becomes apparent that while the Marine Corps has grown in stature during its 177 years, its mission and status within the Navy have changed but little. Since 1798, Marines have been on duty in ships of the fleet, on garrisons ashore, and for any duty directed by the President. In 1836, the President was given authority to order the Marines to duty with the Army. That law remains in effect.

STATUS IN NAVY DEPARTMENT

Lest there be misconception from definition of terms, it should be remembered that the Marine Corps is one of the four military services of the Armed Forces. There are three departments (Army, Navy, Air Force) within the Defense Department—the Marine Corps being one of the two services, along with the Navy, in the Department of the Navy. The military heads of the two branches—the Chief of Naval Operations and the Commandant of the Marine Corps—are each directly responsible to the Secretary of the Navy.

The term partner is often used to express the true concept of this relationship. In actual practice, the term becomes even more fitting, for each service supplies the other with certain elements that are lacking within the parent organization. For example, Navy has a medical corps, a dental corps, and a chaplain corps within its organic structure. Since Marines do not perform such specialist functions these services are furnished by the Navy.

The Marine Corps, in return, has guard detachments aboard ships of the fleet, and at major naval shore installations throughout the world. Fleet Marine Forces carry out their role as specified in the Security Act, by capturing or defending land objectives incident to a naval campaign.

The aviation arm of the Marine Corps is closely allied with the Navy, also—perhaps even more closely than any other part of the Corps.

Marine pilots receive their training and earn their wings at Navy training bases. They are officially designated as Naval Aviators, although their training is not limited to aviation alone.

Service in support of Fleet Marine Forces is the specific function of Marine Aviation. Therefore, the Marine pilot is trained in the art of surface warfare—at Marine Corps Schools, Quantico, Va., in the field with ground troops, and aboard naval vessels. In order to deliver worthwhile close air support, a pilot must be thoroughly familiar with the problems of those being supported. The extra lieutenant in a lead tank or the captain in a forward foxhole is quite likely a pilot serving as a Forward Air Controller. He knows the capabilities and limitations of the aircraft and the type of armament best suited for a target, whether a tank, a bunker, or a slit trench.

INTERNAL ORGANIZATION

A background picture of the Corps, and its relationship to the Navy, paves the way for examination of the organization of the Marine Corps itself. As a whole, the Corps is organized into two principal groupings—(1) operating forces and (2) supporting establishment.

The operating forces are further sub-divided into three functional groups—(1) Fleet Marine Forces, (2) forces afloat, and (3) security forces for naval establishments.

The Fleet Marine Forces are land and air elements organized to balance within the Pacific and the Atlantic Fleets. These forces carry out amphibious operations essential to the prosecution of a naval campaign.

The forces afloat are detachments to be found aboard carriers, battleships, and cruisers of the fleet.

The security force is the Marine component of a naval shore activity. Its primary mission is to provide internal security for naval activity.

The First Marine Division has known the fury of three Korean winters.

The other large group, the supporting establishment, includes Corps Headquarters, training facilities, logistic supporting activities including major bases and supply depots, reserve administration and training, and the recruiting service. The mission of the supporting establishment is to back up the operating forces.

FLEET MARINE—PACIFIC

Fleet Marine Force, Pacific, has Headquarters at Pearl Harbor and consists of the First Division, now in Korea under operational control of the Eighth Army, and the Third Division, located at Camp Pendleton, Calif. The First Aircraft Wing is in Korea where land based units are operationally under the Commanding General, Fifth Air Force. Carrier based units are under the operational control of Commander Naval Forces, Far East. Senior air commander in the Fleet Marine Force, Pacific, maintains his headquarters at El Toro, Calif. The air wing and the division are separate commands, neither subordinate to the other.

In addition there are Force Troops, based at Camp Pendleton with elements on duty in Korea and Japan in support of Marine Forces in the Far East. These include heavy artillery battalions, engineer troops, and other combat support and service support units not organic to the division.

FLEET MARINE—ATLANTIC

Composition of the Fleet Marine Force, Atlantic, with Headquarters at Norfolk, Va., is similar to that described. The principal ground unit is the Second Marine Division, based at Camp Lejeune, N.C. It is supported by Force Troops, also located at Lejeune.

The Second Marine Aircraft Wing is based at Cherry Point, N.C., and is the principal tactical air component of the Atlantic Fleet Marine Force. The Third Marine

The bullet-swept streets of Seoul—a blazing challenge to tanks and men.

The red glare of rockets illuminates the battlefront as Marines launch a barrage.

Aircraft Wing, re-commissioned in January, 1952, is based at Miami, Fla. The Commanding General, Aircraft, Fleet Marine Force, maintains headquarters at Norfolk, and serves as Deputy Commander, Fleet Marine Force, Atlantic.

Commanding Generals of the two Fleet Marine Forces are under operational control of Commanders in Chief of the Atlantic and Pacific Fleets but are responsible for administration, training, etc., to the Commandant of the Marine Corps, General Lemuel C. Shepherd, Jr., whose headquarters are in Washington, D.C. General Shepherd's staff is headed by an Assistant Commandant who serves as Chief of Staff and includes the Assistant Commandant for Air, who functions as the Assistant Chief of Naval Operations for Marine Aviation.

These various elements comprise the active Marine Corps, including regulars and reserves.

MARINE RESERVE

An extremely important component of the Marine Corps is its reserves. The reserve component is organized, equipped, and trained to provide personnel for mobilization until programs established subsequent to mobilization can meet the needs.

There are two principal divisions of the reserve, the organized and the volunteer. Personnel of the organized ground reserve are divided into about 200 units, of types corresponding to the regular Marine Corps, and are available for integration into the Fleet Marine Forces when necessary.

The volunteer reserve, consisting mainly of trained specialists and technicians, is maintained to provide a reservoir of personnel, not available from other sources, to meet requirements of the Marine Corps in the event of national emergency. This personnel is normally unable to join the organized reserve since participation in that program would interfere with civilian pursuits, or because they live at too great a distance from organized units. Volunteer reservists, however, are immediately available for call to active duty in the event of national emergency.

Training of the ground reserve is accomplished through weekly schedules at local training centers, supplemented by two weeks active duty at a regular Marine Corps installation. A small staff of regular Marines is assigned to each Reserve unit for technical guidance and assistance.

Aviation Reserve Training is carried on as a responsibility of the Commander, Marine Air Reserve Training, whose Headquarters are at Glenview, Ill. He is assisted by the Commanding Officers of the Air Detachments and Reserve Squadrons. He reports directly to the Commandant of the Marine Corps, but is under Chief of Naval Air Reserve training for coordination and logistic support.

Today the command includes 30 Marine Fighter Squadrons and 12 Intercept (radar) Squadrons, located at 25 Naval Air Stations throughout the country. The entire reserve is founded on the same "readiness" concept as the regular establishment and offers a balanced air-ground team.

AMPHIBIOUS TECHNIQUES

Due to the nature of the Marine Mission the techniques of amphibious operations have traditionally received great emphasis by the Corps. Combat requirements such as those at Guadalcanal, Tarawa, Iwo Jima and elsewhere proved that this emphasis was wisely placed . . . especially during the past 30 years.

It was realized in the 1920's that should there be a war with Japan, it would involve many amphibious actions. The unsuccessful amphibious Gallipoli Campaign of World War I demonstrated that the tactics and equipment which had been employed in that venture would be hopelessly unsatisfactory in conducting a modern amphibious attack. Accordingly, the Navy and Marine Corps set to work to develop a whole new body of amphibious doctrine —air, sea, and ground—and a new arsenal of amphibious equipment. There were lean times, but what was lacking in funds and facilities was made up in interest and effort. As a result, when the United States was plunged into conflict in 1941, the Navy and the Marine Corps were ready to meet the responsibility.

Efforts of the Corps in amphibious development however did not cease in 1941. Progress went on steadily throughout the war—and afterward. In 1947, the National Security Act made it mandatory by law that the Marines

continue development of landing force doctrines, procedures and equipment. Sooner than expected, in September, 1950, at Inchon, Korea, these newest procedures were put to test.

MARINE DEVELOPMENT CENTER

To carry out efficiently the function prescribed by law, the Marine Corps Development Center was activated at Quantico. Its basic job is to search out and test ways and means of improving, or employing, new tactics, techniques, and equipment for landing forces; and to coordinate landing force development with the other services. Attention of the Center is focused primarily on the future, since it must project the tactics, techniques, and equipment which landing forces, and specifically Fleet Marine Forces, will need under the changed conditions that will prevail tomorrow.

An important component of the Development Center is the Equipment Board which actually antedates the Center. The Board dates back to 1933, and its mission, then as now, is to provide factual information concerning the efficiency and practicability of equipment being considered by the Marine Corps. Except for aircraft and related items, every piece of equipment in use by the Marine Corps—from tent pegs to 155mm guns—has had the official scrutiny of the Board's specialist engineers and analysts. Their stamp of approval signifies that equipment meets the rigid standards necessary for the rough treatment it will receive in combat, particularly by landing forces in amphibious operations.

Often the Board receives articles of equipment which have already been adopted by Army and Navy. However, prior to the Board's own acceptance of such items as standard for Marines the items are tested for multiple adaptability to combined land, air, and amphibious operations under rigid combat conditions. New parts or pieces of equipment must prove themselves better than existing models currently performing the same function.

The Development Center remains today the major military agency which focuses attention on improving methods and equipment employed by amphibious landing forces.

AMPHIBIOUS AIR SUPPORT

The Marine Corps long ago decided that supporting air components must be specially organized and trained. Continuously from the '20's, Marine pilots were acquiring a capability peculiar to the special mission of the Corps . . . to operate from aircraft carriers, an obvious necessity for support of amphibious operations. Without this basic capability, no amount of skill in the techniques of close air support would have been of any value.

Simultaneously the Navy and Marine Corps were also directing special attention to development of planes required for carrier-based air support of ground assault. Fighters and dive bombers were designed for this purpose. As a result the Fleet Marine Force embarked upon its combat role in World War II as a completely integrated air-ground team, with an air component unequalled anywhere for its equipment, technique, and above all, its complete devotion to the needs of the ground component it was to support.

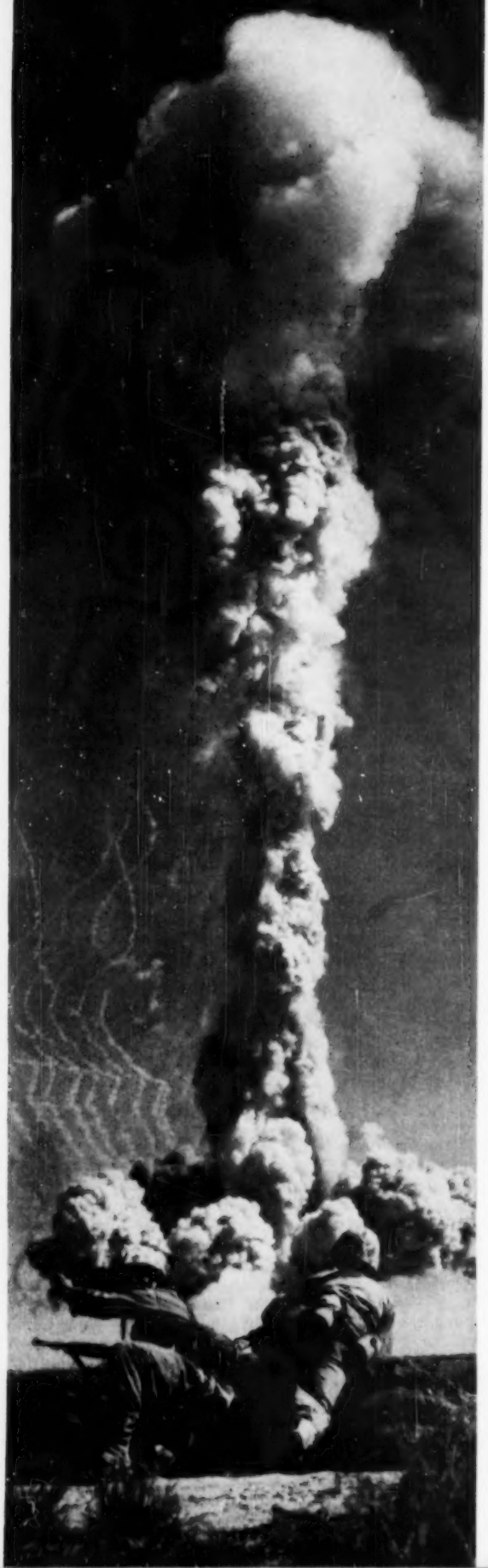
The air-ground team has made a powerful contribution toward the activities of the United Nations in Korea. Marine pilots have flown more than 80,000 ground support sorties in Korea.

SPECIAL MISSIONS

Many projects of the Marine Corps stem from the Security Act, whose phraseology about the Corps reads "and for such other duties as the President may direct." This decree had an early inception, in that similar wording is found as early as 1798 in describing the functions of the Marines.

The early architects of the Nation's military structure recognized the need for a small military force-in-readiness responsive directly to Presidential authority. This Presidential authority relative to Marines—which he may not legally exercise over the other three services—has served repeatedly as a vital basis for rapid commitment of Federal forces in emergencies of widely varying character, when the procurement of Congressional sanction for employment of other troops would have been time-consuming.

Employment of the Marines in Panama, Haiti, Nicara-



gua, in the occupation of Iceland, and recently in Korea are examples of the use of Marines by executive decree.

MOBILIZATION FOR KOREA

When the Korean war started in June, 1950, the Marine Corps had approximately 74,000 officers and men on active duty. That strength was doubled within a few months and now stands at more than a quarter million. In that eventful June the Fleet Marine Force was organized with two divisions and two air wings. One division was approximately half strength and the other about one third.

In early July, '50, the first Marine elements were ordered to the Far East. These units made up the First Provisional Marine Brigade of approximately 6,000, all regular personnel. Shortly thereafter the Joint Chiefs of Staff, in response to repeated requests from General MacArthur, decided to increase Marine Corps commitment in the Far East to a war-strength division (approximately 22,000) with appropriate supporting Marine aviation.

At the time this decision was made there were only 27,000 personnel in both Fleet Marine Forces, including all units of ground and air. Coupled with this decision was approval of a broad program for expansion of all armed services inclusive of a requirement for two war-strength Marine Divisions. This made it necessary for the Corps not only to assemble and dispatch the First Division to the Far East with all possible urgency, but also to proceed immediately with expansion of the Second Marine Division to war-strength.

RESERVE RESPONSE

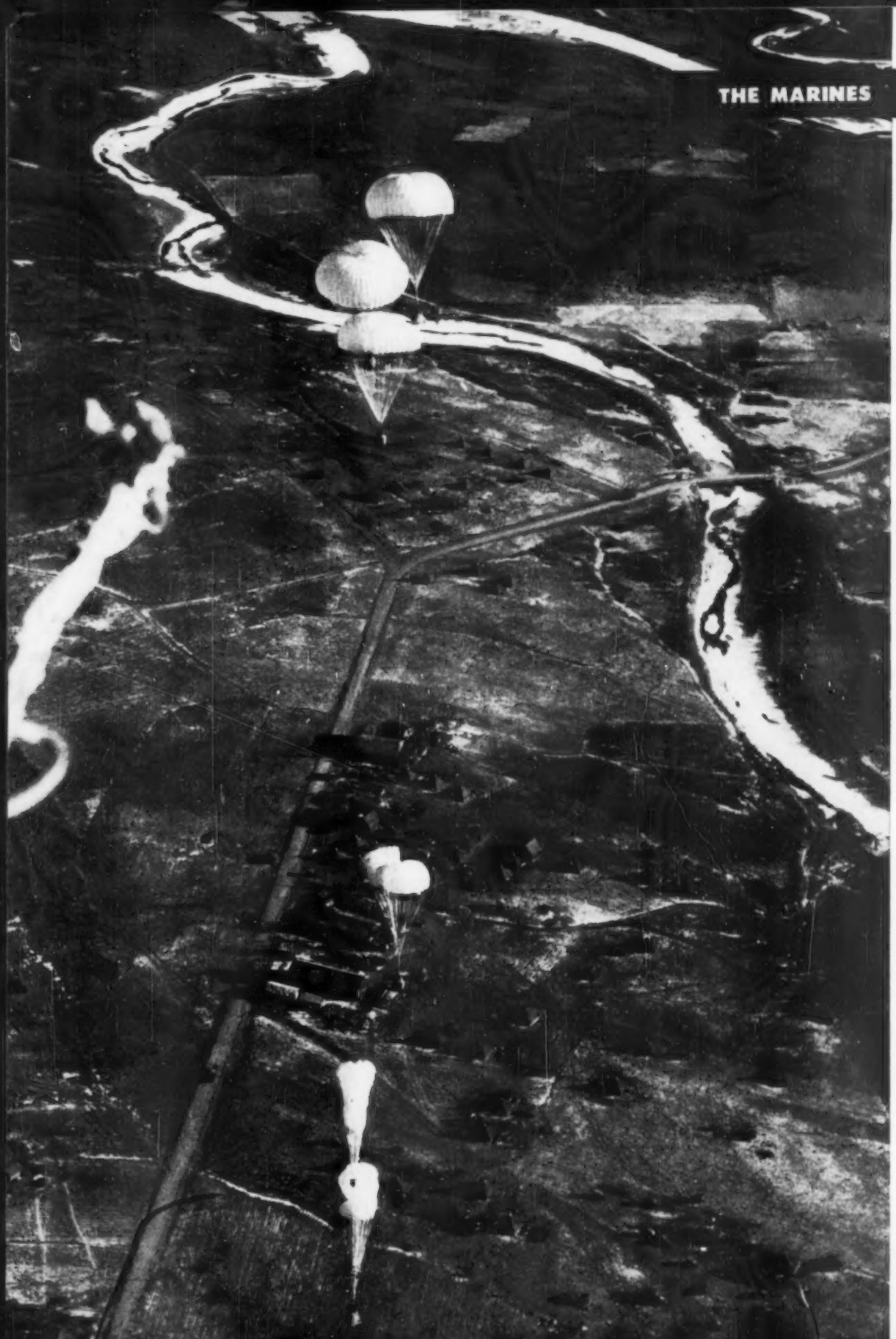
Such a program was impossible of accomplishment without use of the Reserve. Congress and the President authorized mobilization of the Marine Reserve and the first directive to units was issued on July 20, 1950. By September 11, 53 days later, all the Marine Ground Reserve and a portion of the Air Reserve had been mobilized. More than 32,000 Reservists reported for extended active duty in this period.

On September 15, the First Marine Division, as part of the X Corps, made an amphibious assault at Inchon and seized the Inchon-Seoul area. The communist campaign in South Korea promptly collapsed, and the way was paved for successful conclusion of that phase of the Korean war. Because of tide conditions, it was mandatory that the Inchon assault be made on this date or postponed a full month, in which time the North Koreans could have prepared defenses at Inchon and continued their attacks in the South. The First Marine Division totalled 23,000 on September 15, when it made the Inchon assault—one of the most technically difficult amphibious operations in history. A few weeks earlier, there had been less than 7,000 Marines on the Division rolls.

To accomplish this threefold expansion, transport the men, equipment and supplies more than 7,000 miles, and assemble for an amphibious assault required extraordinary efforts. Regular Marines were taken from every possible source. The Second Marine Division was all but decimated. The battalion with the Fleet in the Mediterranean was sent directly to Japan by way of the Indian Ocean. Security detachments at naval stations were re-

Marines prepare to charge an "objective" seconds after an atomic explosion during tests at Yucca Flats in which 2,100 Marines participated.

At right, an air drop of ammunition and supplies for embattled Marines of the First Division in the Chosin Reservoir area of North Korea.



duced to 50 per cent strength—far below that required for normal operation.

READINESS PAYS OFF

As a result of experience and training, the casualties which were the price of Inchon were kept to an almost unbelievable minimum. Another factor which will never be known, but that must be reckoned with, is the number of American lives saved by this operation—lives that would have been lost in more prolonged fighting in the south and those additional ones that would have been lost had the North Koreans been given another month to prepare the defense of Inchon-Seoul.

LESSONS FROM KOREA

The Marine Corps has learned valuable lessons from experiences in Korea—has reaffirmed some avowed contentions, and had a chance to try some new ideas. One precept obvious before Korea was that peacetime organization of a skeleton Fleet Marine Force was suited, but not adequate, for emergency combat operations.

The suddenness with which the Korean trouble started, creating overnight an urgent demand for combat forces, made it impossible for normal mobilization to be carried out. This renewed the evidence that there is stern necessity for Fleet Marine Forces to be organized on a war table of organization during peacetime so as to be instantly ready for immediate employment whenever emergency arises.

The tactics developed over the years are still sound, and their application in combat has been effective. The Marine Corps policy of conducting continuous training of all personnel for duty with the Fleet Marine Force has proved its worth. Individual training stressed by Marines in the security forces and supporting establishment rendered them immediately effective upon assignment to the First Marine Division in Korea.

NEW WEAPONS

Throughout the history of warfare, each conflict, in succession, has provided impetus for development of a new weapon. Very often, however, new weapons have been exploited very little at the time of development, but have been carried over to the next war for full employment. For example, the tank was conceived in the first World War, but not until World War II were tanks used in masses. The airplane is a similar example. This last war was no exception, and a number of new developments made their appearance at its close.

Among the many things which came out of World War II, but relatively undeveloped, was the rotary-winged aircraft, the helicopter.

THE HELICOPTER

Shortly after World War II, the Commandant of the Marine Corps convened a board of officers to explore how amphibious operations should be altered to meet the problems of the atom bomb.

In February, 1948, an experimental helicopter squadron was commissioned at the Marine Corps Air Station, Quantico, Va., to explore the potentialities of helicopters in amphibious operations.

Budget limits precluded extensive experiment, but considerable progress was made in analytical use of the ungainly looking craft. It was determined that its military capabilities were so diversified that it could not fail to be an important weapon.

The atom bomb is deadly where shipping is concentrated, but its effectiveness is lessened where shipping is dispersed. The helicopter provides a vehicle that can transport troops from vessels dispersed at sea and concentrate them on an objective ashore. Good drop areas,

Where Marines go, the *Panther* prowls ahead.

Marine replacements arrive at a forward air strip.

required by airborne troops, are unnecessary for the helicopter. After unloading troops and equipment they may return to the ships, a hundred or more miles at sea, for a second load. Though the range of the helicopter is short compared to the airplane, its range is quite adequate for amphibious attack.

The first historic troop airlift by helicopter in a combat zone was carried out on September 20, 1951, when 247 heavily armed Marines were lifted 13 miles through the air of North Korea to occupy a hill, referred to as a "postage stamp at 3,000 feet." The operation was accomplished—two landing areas were cleared; plentiful supplies of food, water, and ammunition and 247 Marines delivered to screen the First Marine Division's relief of ROK troops—in less than four hours. The company commander estimated that it would have taken his men an entire day on foot to cover the ground they overflew in 20 minutes. Another first was racked up by the Marine Corps and the worthiness of transport helicopters demonstrated in combat.

Helicopters are also used effectively to bring in supplies and evacuate casualties on the same round trip. The Marine Corps considers the helicopter essential to future operations, since it provides support which, in many cases, could not otherwise be had.

NEW ARMOR

Another new combat item already has saved numerous Marine lives in Korea. This is body armor, developed after nearly eight years of research in conjunction with the Naval Bureau of Medicine and Surgery. This armor is actually a vest which covers the torso of the Marine, weighs a little over seven pounds, and is designed to stop fragmentation ammunition which causes 70 per cent of combat wounds. Early models of the armored vest were tested on Okinawa in 1945, but only recently have they been perfected to where they are practical. The vest will stop grenade and mortar fragments, as well as pistol and carbine bullets. It is actually quite comfortable to wear, and all Marines who require it have been equipped. There have been several miraculous incidents in which Marines have had their legs and arms completely riddled with fragments, but the more vital parts of the body have been saved by the vest.

A tough guy to whip.

MAKING OF MARINES

Traditionally there has been high *esprit de Corps* in the Marines. It is of value to examine the individual Marine to learn why. What characteristic peculiar to the Corps fosters its reputation as a great fighting force?

Enlisted men of the Marines are normally volunteers, although twice, during World War II and in the present conflict, a certain percentage of recruits have been provided by Selective Service. Upon enlisting, the recruit, following the tradition of many years, is sent to one of two depots located at Parris Island, S.C., and San Diego, Calif. There he receives 10 weeks of intensive training intended to make a Marine of him. There he receives, also, his first touch of the spirit of comradeship in arms basic to an intense Marine loyalty.

In boot camp, as it is commonly called, each man is assigned to a recruit platoon. This system has proven effective in that it provides a comparatively small train-

ing unit, permitting closer and more personal supervision while encouraging unit pride. A drill instructor, carefully chosen for his qualities of leadership and representative of the finest of Marine Corps noncommissioned officers, is in charge of the platoon. If the platoon does not make a good showing, it is considered a reflection on the drill instructor, who is under constant surveillance by his superiors. This tends to foster an attitude that the platoon is no better than its poorest man, which in turn results in the platoon insisting that the individual do his best, and the individual feeling that he owes allegiance to his platoon.

Once he completes basic training, the Marine is assigned to other specialized technical training for a period of about two months to prepare him for the rigors of combat. Once he joins his regular unit, the same pride is manifest, with each unit attempting to prove that it is the best platoon, in the best

Marine rocket mission in eastern sector of Korea.

company, in the finest batallion, in the number one regiment in the top division in the Marine Corps.

MARINE OFFICERS

For its officer personnel, the Marine Corps relies on no single source. A small percentage of Marine officers usually has been selected from the Naval Academy, and a group of meritorious young noncommissioned officers has been chosen annually from the ranks. In addition to these, chosen graduates from civilian universities, reserve officer candidates, and former Naval Aviation Cadets have also been commissioned from civilian life. The breadth of this selection has given the Corps a comprehensive base.

Marine officers receive initial training at Basic School, Quantico, Va., where each newly commissioned second lieutenant undergoes post-graduate instruction designed to fit him for general duties as a line officer. In addition to necessary military subjects, the fledgling is impressed with the fact that as a leader he has a dual responsibility. He must, of course, accomplish whatever mission is assigned, but furthermore must learn that he has a great responsibility to the men and for the men who will be in his command. He is shown that an officer must be sincerely interested in the well-being of his men. This interest is manifest in any Marine Corps unit in great part because the majority of officers were formerly enlisted men.

The relation between officers and men is in no sense that of superior and inferior, nor that of master and servant, but rather that of teacher and scholar, leader and follower.

The Marine Corps depends upon the individual. It is realized that the desires of the individual must often be subjugated to the needs of the group for successful accomplishment of a mission, but it is not felt that a man loses his individuality because he is a cog in a big wheel. A platoon or company commander should be able to give not only the name of any selected man in his unit, but also to know something of his background, his marital status, his children, and his outside interests. This close association is a vital ingredient in building the confidence of both officers and men, and ultimately developing the famed *esprit*.

LOOKING AHEAD

No one today knows what the future will bring. There may be more "Koreas." Ready forces will always be needed. The Commandant of the Marine Corps has said that his principal objective is the continued readiness of the Corps. The Marines have a unique responsibility in this respect and feel it keenly. To hold the line against emergency attack—to be first afield against danger to the country—to be ready, willing and able to go anywhere at any time against any odds—this is the mission of the Marines—the concept underlying their entire economy.

It would be unprofitable to predict in detail the employment of the Fleet Marine Forces in any future war. Any concept of global war must take cognizance of sea areas, sea approaches, and the sea flanks of any possible enemy. These are the areas of logical Marine employment and its air components. These balanced forces—landing forces with organic tactical air—when joined with appropriate amphibious shipping and other combatant naval elements, are global in the sense of their mobility. The Marine Corps prides itself upon its status as a basic ready-to-act military organization, responsive specifically and directly to the Chief Executive's call to meet the crises which occur in both peace and war.

The task of the Marine is not a glamorous job. It probably is not the most desirable job in the world. But those Marines who carry the small weapons that win big wars, are men. They have seen the worst of it—the worst the enemy and nature can hand out—Belleau Wood, Argonne, Guadalcanal, Bougainville, Iwo Jima, Tarawa, Saipan, Okinawa, and Chosin—and they have been able to take it. They have never failed in the trust the Nation has placed in them—with God's help, they never will. END

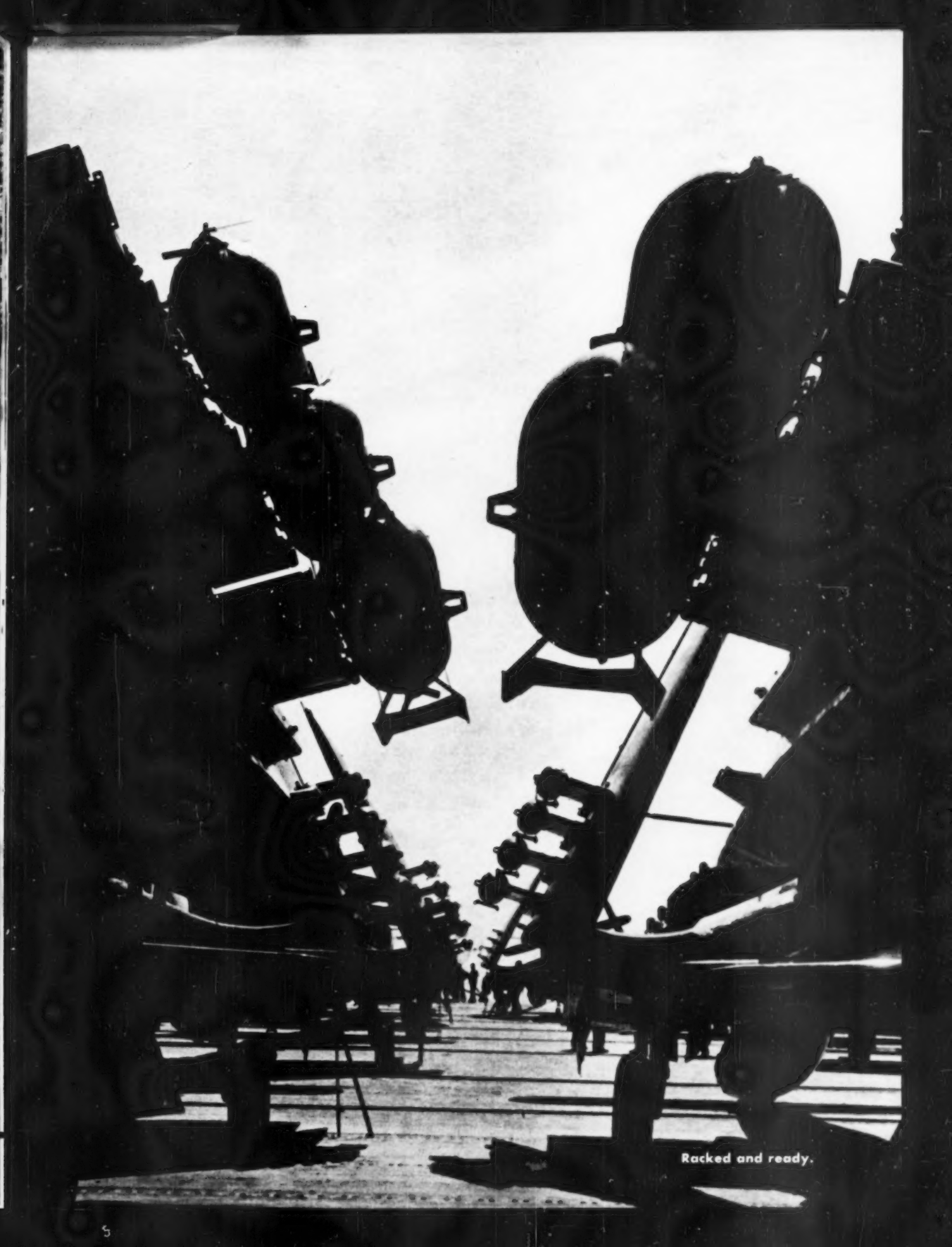
The weapons are iron and steel, but men who wield them—flesh and blood—must have the greater endurance. The business of war is a business of people, whether in trenches or tanks, cockpits or gun turrets. The following pages reveal the Nation's fighting men, about the Nation's business— the enemy, the elements, the eternal tragedy authored by tyrants and aggressors.

B-29 pilot at prayer after mission over Korea.

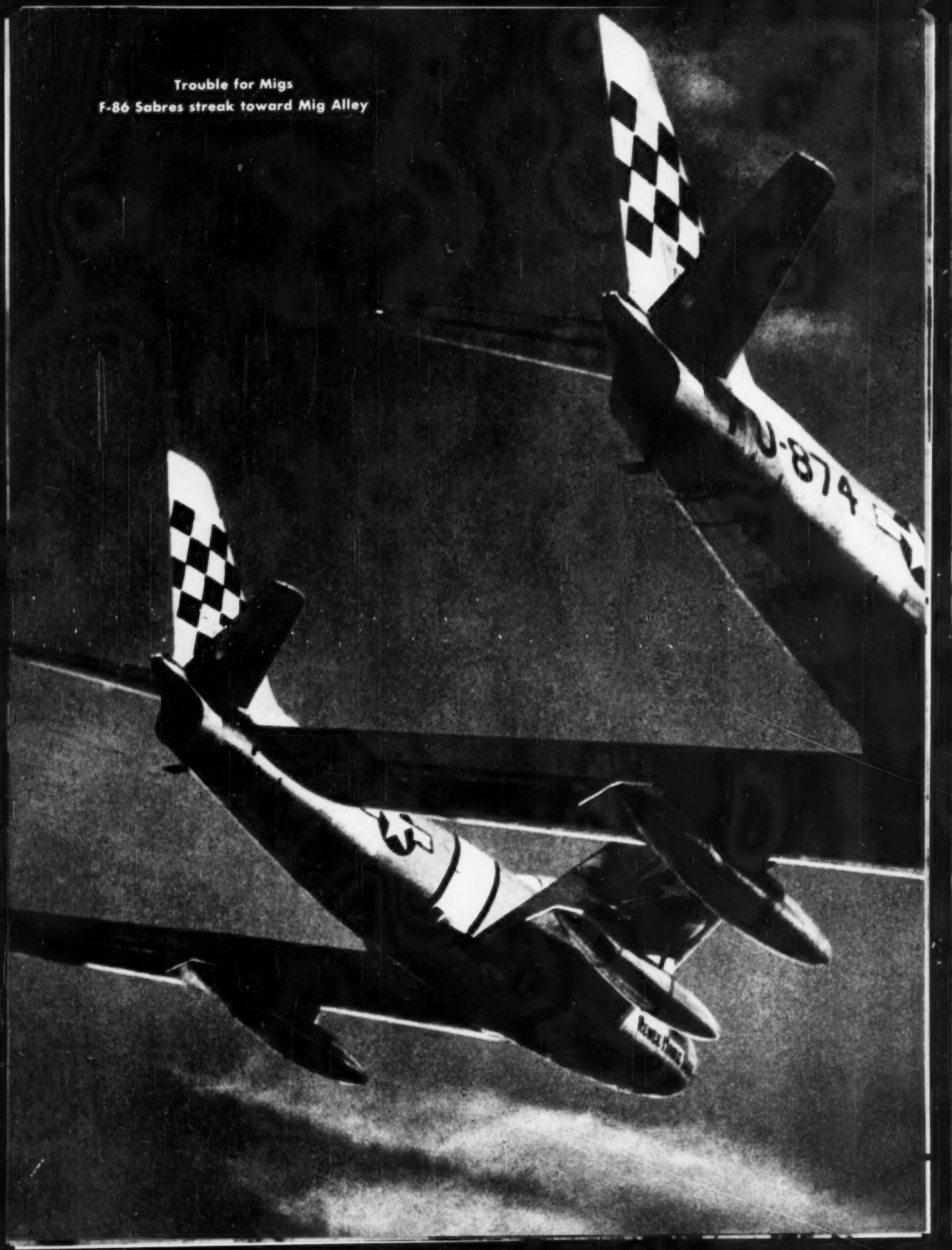
Korean outpost.

75-mm recoilless rifle along the 38th Parallel.

His armored vest already has saved this soldier's life.



Racked and ready.



Trouble for Migs
F-86 Sabres streak toward Mig Alley

Navy's F3D's over European waters

Heavy Weather.

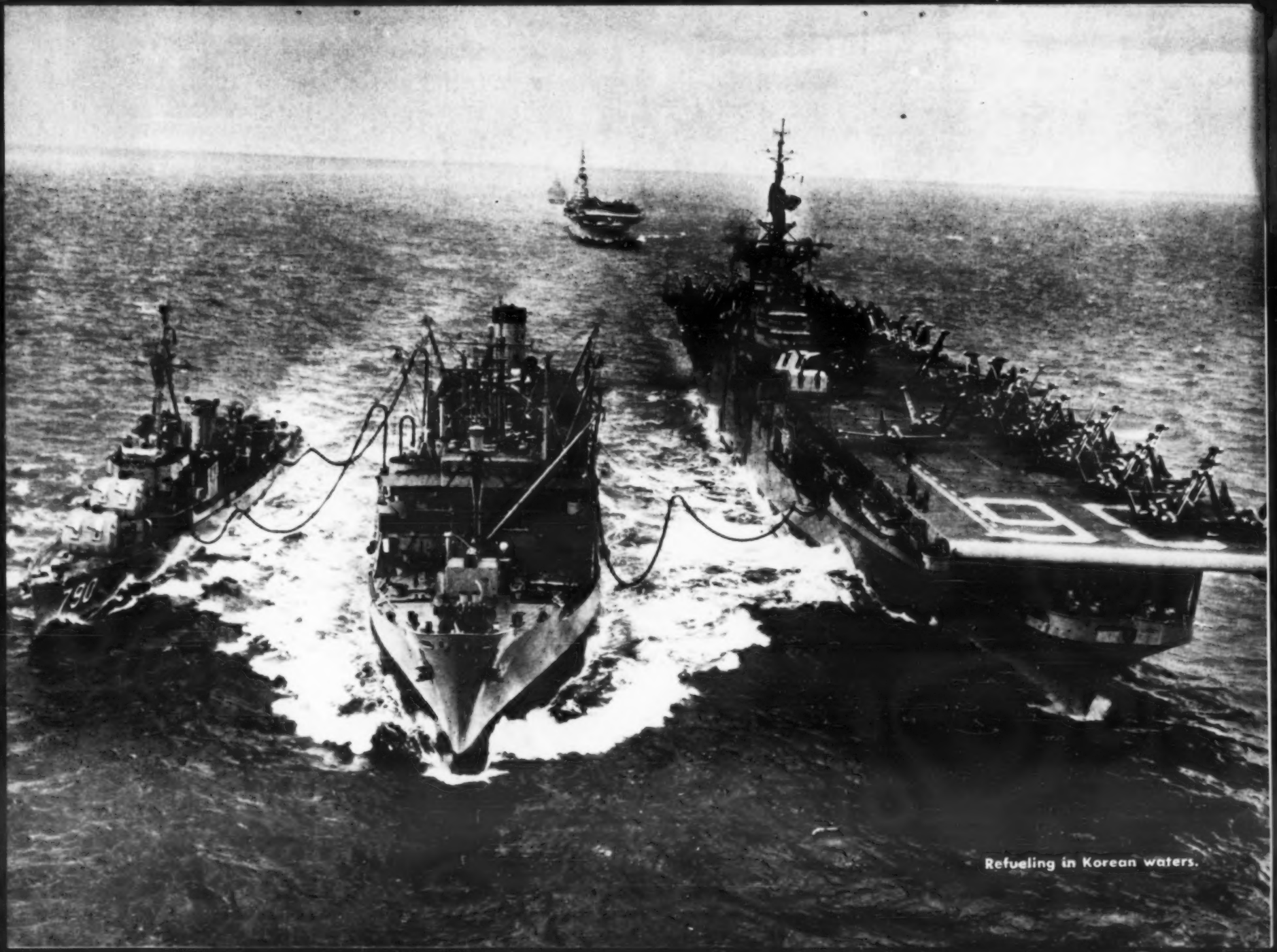
High, fast and deadly
B-47's of Strategic Air Command

Marine gunners move up in Korea

Coming aboard.

M-4 tank action in Korea.

Plasma and prayer.



Refueling in Korean waters.

Mouth of a sky giant—C-124 Globemaster

WILL THIS SUIT FIT YOU?

If you can make the grade, you can fly the latest, hottest, fanciest jobs in the air— and do it within one year.

IT TAKES a good, tough, serious guy to wear the equipment of an Aviation Cadet. But if you can measure up, here's your chance to get the finest in aviation training—training that equips you to fly the most modern airplanes in the world and prepares you for responsible executive positions in industry both in military and commercial aviation. And you do your country a service.

It won't be easy! Training discipline for Aviation Cadets is rigid. You'll work hard, study hard, play hard—especially for the first few weeks. But when it's over, you'll be a pro—with a career ahead of you that will take you as far as you want to go. You graduate as a 2nd Lieutenant in the Air Force, with pay of $5,300.00 a year. And this is only the beginning—your opportunities for advancement are unlimited.

ARE YOU ELIGIBLE? To qualify as an Aviation Cadet, you must have completed *at least* two years of college. In addition, you must be between 19 and 26½ years, unmarried, and in good physical condition.

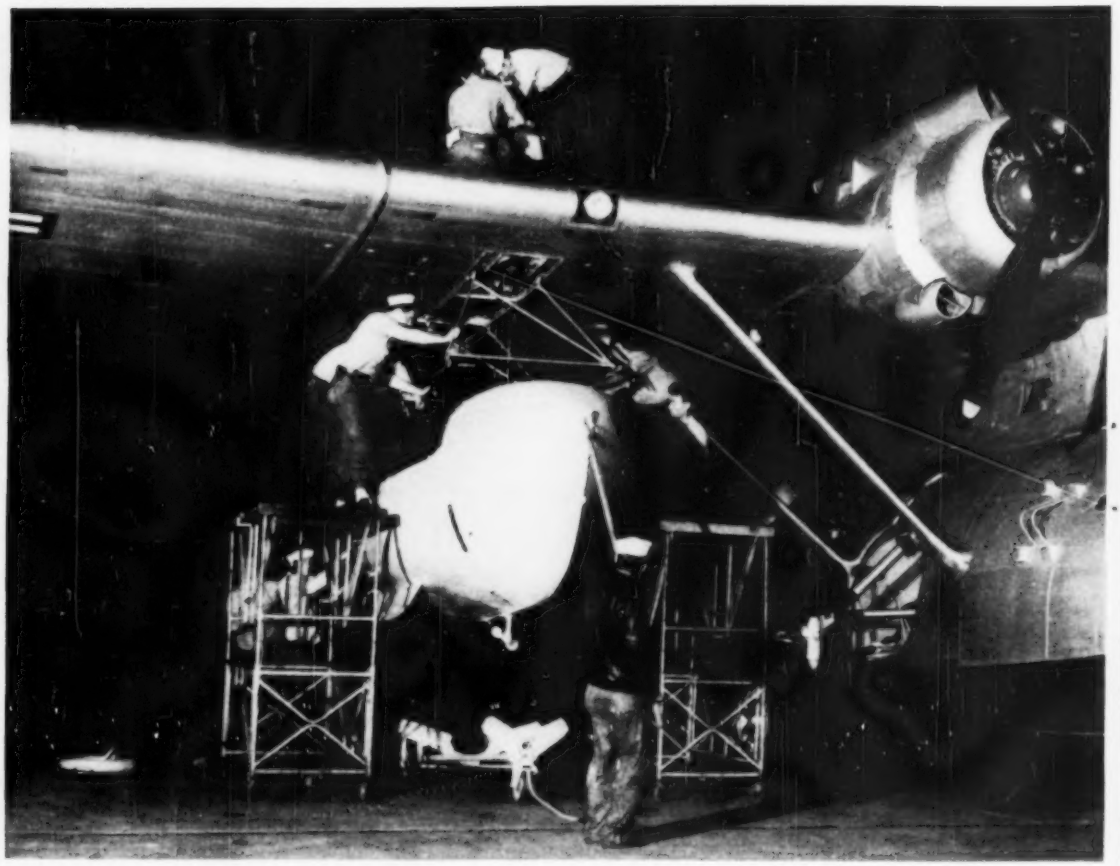
New Aviation Cadet Training Classes Begin Every Few Weeks!

HERE'S WHAT TO DO:

1. Take a transcript of your college credits and a copy of your birth certificate to your nearest Air Force Base or Recruiting Station. Fill out the application they give you.
2. If application is accepted, the Air Force will arrange for you to take a physical examination at government expense.
3. Next, you will be given a written and manual aptitude test.
4. If you pass your physical and other tests, you will be scheduled for an Aviation Cadet training class. The Selective Service Act allows you a four-month deferment while waiting class assignment.

Where to get more details: Visit your nearest Air Force Base or Air Force Recruiting Officer. Or write to: Aviation Cadet Headquarters, U. S. Air Force, Washington 25, D. C.

U.S. AIR FORCE



A droppable lifeboat is attached to the wing as a Coast Guard PBY prepares to take off from Elizabeth City, N. C., for rescue operations in a Florida hurricane area. The boat contains blankets, rations, medical supplies.

Above, a Coast Guard rescue by helicopter from the impenetrable tundra of the north.

Below, Coast Guardsmen at Salem (Mass.) Air Station ease a litter bearing a hemorrhage victim from a PBM's hatch. The patient was transferred to the PBM from a vessel at sea.

The Coast Guard

One afternoon passengers bound for Germany aboard the transport *General J. H. McRae* were watching her crew at lifeboat drill. With sudden horror, they saw a line part and a boat weighing over six tons careen suddenly into an assistant engineer and a room steward.

Following diagnosis of compound fractures of both legs for the steward, and internal injuries for the engineer, the *McRae*'s radio operator was soon at his key. Shortly afterward, a Martin PBM *Mariner* taxied away from its ramp at the Coast Guard Air Station, Salem, Mass., and roared out on a seaward course into the night. Dawn found it 500 miles at sea riding swells near the *McRae*, awaiting transfer of the critically injured men. At nine a.m. the PBM was back at its ramp, and the steward and engineer were in the hands of surgeons at Brighton (Mass.) Public Health Service Hospital.

Sea rescues by air occur frequently on both sides of the country, especially in the Atlantic, and the press finds their dramatic content a spur for numerous headlines.

What impresses Coast Guard aviators most is that through risking their own lives in offshore landings, they are able to reduce the casualties of sea emergencies.

What percentage, or numerical count, would apply here is impossible to say. Nevertheless, one can imagine what would happen without Coast Guard planes in cases such as the one where the wooden-hulled lumber freighter *SS Salina Cruz* radioed that she was afire off the coast of Washington, with her 17 men ready to abandon ship.

Two PBY's from the Port Angeles Air Station found the freighter practically a torch, her crew adrift in lifeboats, in seas that would have made any attempt to land a plane little less than suicidal. The PBY's advised their station of these circumstances, and were told that a Federal Fish and Wildlife vessel, the *Black Douglas*, was en route from 50 miles away.

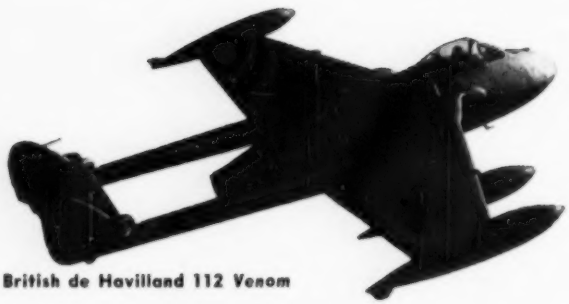
Dropping supplies and emergency equipment, the PBY's circled for hours, waiting, seeing the seas grow higher. In dusk, then dark, with the boats being buffeted below, the plane crews began to drop flares.

In this guiding illumination, the *Black Douglas* later that night found and saved 17 men who, otherwise, almost surely wouldn't have seen dawn.

In a worse situation, so recent you may remember it, the Norwegian freighter *Black Gull* sent this message: "Ship afire. Emergency assistance needed. Lifeboats burned."

Two Coast Guard planes and four cutters raced for the scene, also the commercial liners *Gripsholm* and *Excalibur*, which were nearby. Meanwhile, four crewmen were trapped inside the stricken freighter, and died; the remaining 45 passengers and crew, some already burned, were over the side into the cold, black Atlantic. Luckily, all were alive when the *Gripsholm* arrived and found them—in flarelight from the planes.

Stories like these would bring unbounded joy to the hearts of a few Coast Guard officers who, in early 1915, developed an obsession that aircraft could multiply the effectiveness of searches for lost and disabled schooners, and simultaneously cut the cost (*Continued on page* 105)

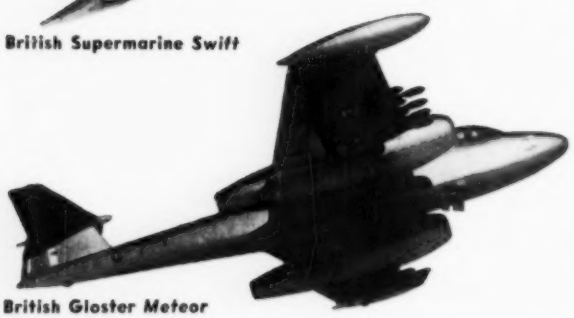


British de Havilland 112 *Venom*

Canadian-built F-86 *Sabre*

NATO

British Supermarine *Swift*



British Gloster *Meteor*

In 1948 a mutual defense alliance, to be known as the Western Union, was signed at Brussels by five European nations . . . France, Belgium, Holland, Luxembourg and the United Kingdom.

Following this step the United States inaugurated talks with Western Union countries on the proposition of organizing a defense system for the entire Atlantic community.

This second move led to the formation of NATO, North Atlantic Treaty Organization, whose charter was signed in April, 1949, by the five Western Union nations, the United States, Norway, Denmark, Iceland, Canada, Italy and Portugal. By autumn, 1951, the number of NATO members was increased to 14 through the addition of Greece and Turkey.

Since organization of the Western Union, and spurred by the formation of NATO, the free family of North Atlantic nations has been continuously laying broad foundations of airpower.

The task has been most complex. It has called for a

British de Havilland *Vampire*

U. S. Republic F-84F *Thunderjet*

Air Defense

network of warning systems, telephone and teletype lines beyond anything ever before contemplated. It has required international standardization of procedures aloft and on the surface. It has involved communications by radio, radar, telegraph and telephone.

Despite the complexities, however, NATO has produced a degree of integrated airpower remarkable to students of military affairs.

In frequent air exercises, British, French, Belgian, Dutch and American squadrons have worked effectively together in battle formation. Month by month the expanding scope of these tests has progressed until squadrons are interchangeable, regardless of nationality, until enemy bomber strikes can be plotted and intercepted across Europe without regard to purely national frontiers. All this has been necessary spade-work without which NATO Air Forces would be merely uncoordinated collections of aircraft.

But, at the same time, there has been uneasiness lest the aircraft themselves were (*Continued on page* 120)

French Dassault *Mystere*

British *Meteor* N. F. MK. 11

Cessna Celebrates the "Golden Year of Flying" With Its

Greatest Achievement in

A STATEMENT FROM DWANE L. WALLACE

(PRESIDENT, CESSNA AIRCRAFT CO.)

About a Fast, Modern, All-Metal Airplane—Priced for Small Businesses as well as Large.

"Cessna's history extends through forty-two of flying's fifty years. And through it all, we have had just one dream . . . one aim . . .

"*. . . to make flying so safe—so easy—so comfortable and convenient that the business airplane would become as useful and accepted as the business automobile.*

"We've made great progress in this. Today, the Cessna 170 is America's largest-selling personal and company airplane and Cessna 170 and 190 Series airplanes are being used by thousands of ordinary

ALL-NEW SILHOUETTE—from the spinner on nose to the new "square" tail design which was adapted from Jet aircraft. This tail assembly increases speed by eliminating trim tabs and reducing "drag." One of the secrets of the "Golden Year" 180's speed and fine flight characteristics is its exceptional aerodynamic cleanliness!

CONTROLLABLE ALL-METAL, CONSTANT-SPEED PROPELLER . . . 225 h. p. Continental engine—help give this plane a cruising speed of well over 150 m. p. h. . . . a range of 750 miles.

New "Golden Year" Cessna 180

Airplanes for Business!

businessmen—not as playthings—but as practical, profitable, everyday business tools.

"Now—for flying's 50th Anniversary—we are ready with the greatest business airplane of them all . . . the new "Golden Year" Cessna 180!

"While I've been proud of other Cessna airplanes—I'm so proud of this one that I want to emphasize three things about it personally.

"First—SPEED! We have achieved in a relatively low-priced airplane a cruising speed of OVER 150 M.P.H.

"Second—PRICE! The new 180 sells for $12,950 . . . close to ONE-THIRD LESS than any other make of airplane in the over 150 m.p.h. class!

"And third—LANDING, TAKE-OFF AND FLYING CHARACTERISTICS! They are outstanding. It's the finest engineered piece of flying equipment ever rolled out of the door here at Cessna. Easy to fly and to operate out of large fields and small."

CESSNA "PARA-LIFT" FLAPS—reduce landing speeds a good 10%—shorten take-offs. Make small field landings safe and practical. And Cessna's famous Safety Landing Gear smooths out rough fields.

LUXURIOUS CABIN with lots of room for four. Beautiful upholstery. Smart instrument panel with controlled lighting. Efficient heating and ventilating system — for perfect comfort at all altitudes, in all seasons.

Also See

THE "GOLDEN YEAR" CESSNA 170—America's largest-selling private plane made new and better than ever. Lowest-priced all-metal, 4-place plane on the market . . . by several thousand dollars.

THE CESSNA 190 SERIES; Luxurious 4-5 place executive planes. America's greatest bargains in business transportation.

Look in the Classified Telephone book for the name of your nearest Cessna dealer . . . or write:

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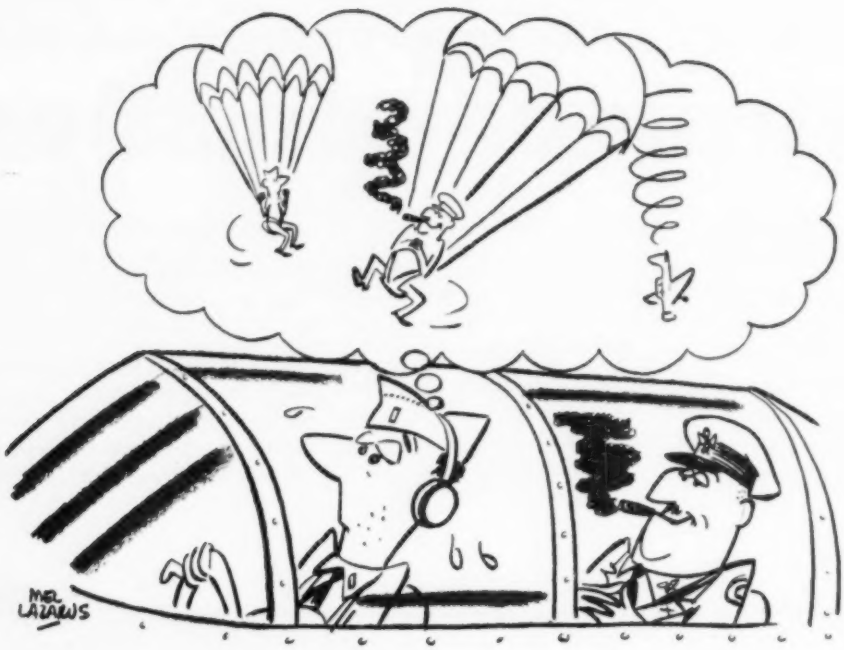
WICHITA, KANSAS

over 150 M.P.H. Cruising Speed

NUMBER 158



I Learned About Flying From That!

Even a hot pilot eventually learns that a flight's got to have some insurance.

By ROBERT B. PARKE

THE Colonel was a paddlefoot and a nice guy. I was a Lieutenant and an Air Force pilot assigned to fly him from Sebring, Fla., to Atlanta, Ga., for an important meeting. The plane was a shiny AT-6. As we took off, the colonel called me up on the interphone and asked if it was O.K. to smoke.

We wheeled out of the pattern toward the line of midday cumulus clouds to the north and I said sure it was O.K. Soon the fragrant smoke of a good cigar drifted up to my half of the fore and aft cockpit. Two cigars later, and right on top of our ETA, we were on the ground at Jacksonville.

While the plane was being gassed I checked the weather. The Colonel followed me around asking politely about this and that. He'd never been in a plane before. I, on the other hand, had just come back from overseas with a thousand-plus hours and had recently earned an instrument ticket. It was pretty hard not to play the bold pilot role.

A mean-looking front had built up beside the route and was getting ready to smother Atlanta. The weather man suggested we lay over. That didn't suit my plans or the Colonel's, and I took up the study of the weather maps myself. In short order I had it figured.

The front was moving at a predictable rate from west to east in a line several hundred miles long. It seemed reasonable to suppose that in the time it would take us to get up to Atlanta, the front would pass, leaving open both our destination and a flock of alternates to boot. For the record, Atlanta was then open and could logically be forecast to be open on our arrival. I explained all this to the weather man in my pilot-knows-best manner.

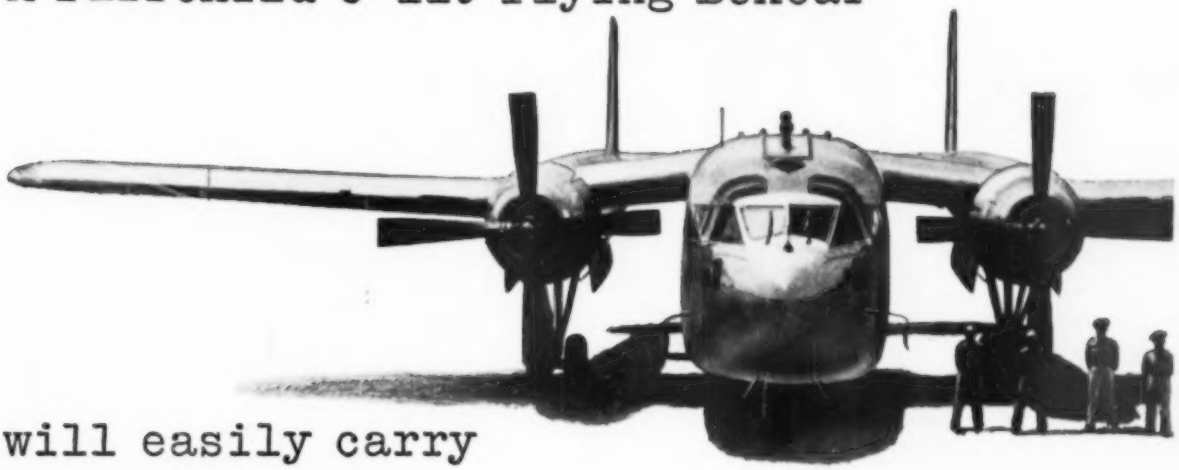
Pointing out that the front could just as easily hover around Atlanta, leaving me gasless at night with no alternate, he said he'd have to recommend that operations not clear me. He concluded with a phrase I was to think of many times afterwards: "The flight's got no insurance." The way he said it let me know he meant if any one of a dozen things went wrong I'd be in trouble; the conditions didn't balance the risk.

But I was in no mood for homilies. I re-explained. He said no. I got technical. He was adamant. I insisted. He left. When he came back I relented. Sly as the wolf in Red Riding Hood I announced I'd changed my mind and would clear for Macon, this side of Atlanta. Macon was open and forecast to remain so. The harassed weather man signed with relief, as did operations. Soon the Colonel and I were off in a cloud of Panatella smoke.

At the first check point I asked for Atlanta weather and found it clear, with Birmingham open as an alternate. I requested a change in flight plan. Flight Service, the clearing agency for airborne planes, saw it my way and soon Atlanta was my destination again. Red Riding Hood was practically mine.

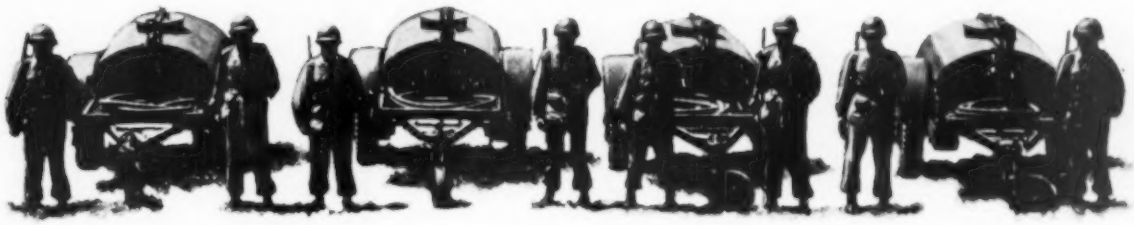
The first clouds swirled around us about dusk. I went on the gauges as we plowed (*Continued on page* 123)

A Fairchild C-119 Flying Boxcar



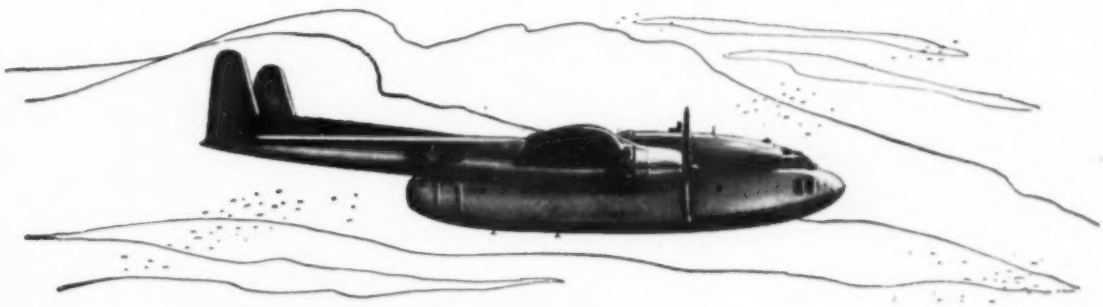
will easily carry

four 250 gallon water trailers (loaded)



plus eight supply men into forward combat

areas...and it is <u>being</u> done day after day!



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WING TALK

MAJOR ALEXANDER P. DE SEVERSKY, noted airpower lecturer and author, receives an engraved lighter from Col. Bennett Crain, Maryland wing commander, following a CAP anniversary address in Baltimore.

CAP AT SCENE

Flying his ski-equipped *Cub* CAP Member (Dr.) Terris Moore, president of the University of Alaska, landed on an 8,000-foot glacier atop Mt. Gannett to positively identify the wreckage of an Air Force C-124. With Dr. Moore was Lt. Thomas S. Sullivan (USAF), survival expert from Air Rescue Service at Elmendorf AFB, Anchorage.

"We identified it," Dr. Moore said, "by the tail assembly which was sticking up through the snow. It had the plane's number painted on it—1107."

Because of adverse winds, the two had to remain overnight at the scene. Going in, Moore was able to land "right alongside," he said.

The wreckage might never have been found, according to Dr. Moore, if the apparent snow-slide had been heavier following the impact. As it was, most of the C-124 remains were invisible from the air.

Dr. Moore, who is considered an expert in air search-rescue, has flown on many CAP missions, the wing reported from Anchorage. On his landing on the Gannett glacier, the doctor went in uphill but took off downhill and upwind.

DETERMINED CADET FLYER

Flying for a week in his tiny Funk monoplane, Cadet Mark Riguette, of Woodland, Me., landed at Hawthorne, Calif., to enroll as a student with Northrop Aeronautical Institute. Flying coast to coast direct (and solo), Cadet Riguette was forced down several times by sleet and snow, but was never lost for a minute!

At 19, this determined X-country flyer has a private pilot license and has been in CAP work for more than two years.

BARNSTORM KANSAS

Col. Paul Threlfall, national adviser from Wichita, Kans., reports Operation CAPsell a going concern in the breezy state with a special CAP show winding up a barnstorming tour of high schools. The outfit is made up mainly of the St. John's Military Academy drill team from Salina, where the CAP program has been a major study for eight years.

Main supporting element is Brig. Gen. H. R. Spicer's Wichita Air Force Base Band. The show was a result of months of planning by Col. R. L. Clem (CAP), St. John's superintendent; Col. Theodore Chapman, former wing commander; and General Spicer, CG of Wichita AFB. Following each performance Lt. Col. John Fitzpatrick, wing director of cadets, and a special recruiting team answer questions from the student body.

The drill team itself is a crack outfit and, according to Lt. Col. Henry Zoller, wing commander, hopes are high that it will reach the National Drill Competition next summer. ("Operation CAPsell" is a program initiated last fall by the national commander aimed at reviving interest in aviation at the community level and explaining the CAP format to greater numbers of people.)

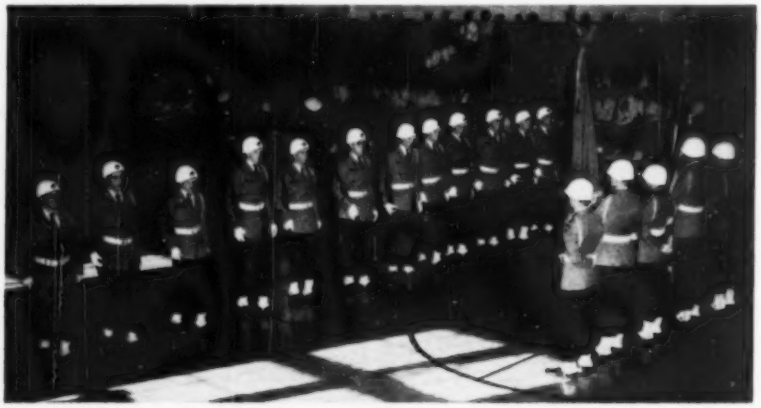
Maj. Gen. Lucas V. Beau, national commander, made the principal address at the Wings Club Wright Memorial Luncheon in New York, then flew back to Washington to receive for CAP the 1952 Frank G. Brewer Trophy at the Aero Club's Wright Memorial Dinner. Capt. Pat Rogers, Alabama AF-CAP Liaison officer, received the State Brewer Trophy, both awards being made for performance in the field of aviation education and air youth activities.

The State award was made in Birmingham, attended by the donor, Frank G. Brewer of that city.

The sixth International Drill Competion will get underway earlier next summer than the usual July 25 target date, according to plans at National headquarters in Washington, thus winding up the three-week program well in advance of school vacation end. Heretofore some cadets returning to homes in the West barely made connections with the first day of school.

Chaplain (Maj.) Lucien A. Madore, Deputy National Chaplain, recently addressed a gathering of superintendents of Catholic schools at a meeting in Washington. He said 250 priests were needed to fill out CAP's growing corps of chaplains.

CADETS of the Essex Squadron, New Jersey Wing, CAP, have prepared a plywood stand for display in theater lobbies, schools and other public places to spur CAP recruiting. Uniformed CAP members above are: Pvt. Judith Matus, CAPC; Capt. Robert Sparks, USAFR; Cpl. Patricia Gray, CAPC; Sgt. Alan Lyttle, CAPC; Sgt. Maureen Jordan, CAPC, and Sgt. Robert Budault, CAPC.



ST. JOHN's Military Academy CAP cadet drill team does its intricate maneuvers in a Kansas high school gym while on tour for CAP recruiting. Traveling with them are supporting elements of a recruiting team, including the Wichita AFB band.

After Korea . . .

After World War II, many young men turned down the opportunity to take advantage of training offered under the GI Bill. Many of these have since seen service in Korea and now wish they had not passed up the fine training they could have had. Are you one of these?

You Still Have That Opportunity

Now that veterans of Korea have that opportunity, don't make the same mistake again. The proper training can still help you to catch up with and progress faster than those not having proper training.

Let Spartan School of Aeronautics Show You the Way

The training received at SPARTAN has helped thousands of young men to advance further and faster than they could possibly have hoped for without such training. Hundreds have been able to progress to top-notch positions in aviation. There is a place waiting for you and SPARTAN can train you — in the least possible time — to achieve success in aviation.

DON'T PUT IT OFF

If you put off taking training now, you will probably never have the opportunity again. Don't you be among those who fail! Let SPARTAN COUNSELORS show you — without obligation — what GI benefits are due you and what aviation training can do for you.

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OPERATORS' CORNER

Key figures at the manufacturers' luncheon, a feature of NATA's Hollywood convention, included: seated (l to r) Ben Mauro, president of Taylorcraft; A. B. Bone, Jr., regional vice-president of American Airlines; Frank Shelton, NATA vice-president for sales and service; Robert S. Northington, NATA president for 1952; standing (l to r) Ralph Kimmer of Hiller Helicopters; Jack Mailer of Beech Aircraft; William T. Piper, president of Piper Aircraft, and R. Tigerman of Cessna Aircraft.

Military Contracts

More widespread distribution of military contract maintenance to smaller shops than heretofore has been requested of the Munitions Board by the NATA. President Robert Northington states that such a policy is expected to become effective almost immediately with the Army Field Forces. Important ground work was laid with respect to Air Force contract maintenance work.

At the annual convention in Los Angeles, George Weitz of the CAA discussed the matter further, including a review of the new maintenance regulations and what they were intended to accomplish. He indicated a better defined system of approved repair stations would definitely link into the expanded military program.

The industry's need for an airman training plan and the right to further participate in contract flight training, as well as the technical field, were covered at the convention by John Griffin. Even though many operators are not now interested in training, Griffin stated that the whole manpower situation was so serious that it called for the efforts of every operator irrespective of his interests.

A resolution was passed by the National Board of NATA to re-introduce immediately training legislation in the 1953 Congress.

Aviation Manpower

In January, 1951, there were some 61,000 civil non-carrier aircraft available for planned use in defense supporting activities. Of these, 52,000 were engaged in operations essential to the national economy, including 10,500 operated by farmers and ranchers, 15,500 in business and professions, 1,000 by local state and federal governments and 25,000 by fixed base operators.

Focal points of practically all of this activity were the 500 large and 5,900 smaller airports on which were located more than 6,100 fixed base operators providing support through sales, servicing, repairs, and maintenance, in addition to a large proportion of the flight activity.

There are a total of 30,102 persons employed full time by fixed base operators throughout the United States. A total of 10,401 employees—pilots, mechanics, technicians—have been lost to the military services, airlines and other positions in the aviation industry since June 25, 1950.

It is also interesting to note that 1,457 persons presently employed as pilots, mechanics, technicians, are vulnerable to reserve recall or selective service.

The CAA records indicate further that on May 31, 1952, there were 1,451 certificated flying schools, whereas in 1947 there were 3,078, a decrease of 53 per cent. It is estimated by the CAA that only about 50 per cent of the currently certificated flying schools are actually engaged in flight training activities.

—Ed Hoadley

In the limelight at the 13th annual convention banquet of the NATA in Hollywood were: left to right, Harland S. Herrin, new NATA president; Gill Robb Wilson, editor and publisher of FLYING Magazine and banquet speaker; Barbara Britton, moving picture and TV actress, and Robert S. Northington, retiring president.

National Aviation Trades Association (NATA) is a service group that represents all service segments of the airport, fixed-base and air service operator. Its staff represents a federation of State Chapters and Members-At-Large. Its purpose is to fountainhead all activities of the American Operator, and to act as a sounding board for better public relations. Its aim: to improve air service operations and promote greater aircraft utilization.

Headquarters are located at 1346 Conn. Ave., N. W., Washington, D. C. Members receive a monthly "Washington News Letter" of confidential legislative and policy news in the making.

National Air Taxi Conference, same address, an affiliate of NATA, represents operators engaged in perfecting and standardizing a system of "through," air transportation.

Opinions expressed in this column are not necessarily those of FLYING Magazine.

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AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is "To make flying more useful, less expensive, safer and more fun."

Headquarters address is Box 5960, Washington 14, D.C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

CUBAN PROGRAM

As this was written, final arrangements were being completed in Miami between officials of the U. S. and Cuban Governments that will greatly simplify the flight of non-commercial, private aircraft between the two countries.

Meeting in Miami, representatives of the two governments, assisted by officials of AOPA, ARINC (Aeronautical Radio, Inc., private radio company owned and operated by the U. S. airlines), and RACSA (Radio Aeronautic a Cubana, S. A., the Cuban counterpart of ARINC), have worked out every detail of the streamlined border-crossing procedure that will be used by civil pilots flying between those two countries, starting early in January.

The new agreement involves ARINC and RACSA because those two companies have the only usable communications link between the two countries, over which the flight-plan and arrival messages can be sent. Both ARINC and RACSA have agreed to carry those notification messages over their system free of charge, so long as they are solely for non-commercial tourist flights. Any other civil flights, like commercial operations with lightplanes, or executive operations with company-owned transport-type aircraft flown by full-time professional pilots, will be charged for at the present standard rates of those companies. Those charges, of course, will be for communications services, and are not for official government services in either country.

In addition to the flight-plan notification system, the Cubans are, on their own initiative, making a clean sweep of all the charges and restrictive practices that have kept most civil planes and pilots out of the country, and which were the reason AOPA, a year ago, notified all its members to stay out of that country until further notice. Much of the new Cuban facilitation program is based on AOPA's suggestions, and upon conferences with AOPA officials.

Much of the credit for the success of the new Cuban program goes to Dr. Antonio Perez Benitoa, director of the Office of Technical Services of the Presidency, and son-in-law of President Fulgencio Batista; and Guillermo Alexander (AOPA 70779), aviation adviser to the Cuban Tourist Institute. Both worked hard to wipe out the mistakes of the previous Cuban administration. Dr. Benitoa was educated in the United States, and is himself a civilian pilot.

AOPA National Headquarters will supply members with the necessary forms for using the new system, and full instructions.

The new system eliminates the last border-crossing bottleneck that has faced non-commercial civil pilots. The system was first used on the U. S.-Canadian border, and later on the U. S.-Mexican border. It has been so successful in those areas that the Cuban plan was worked out along with the many changes in all the other Cuban flight procedures. AOPA participated in the planning of all the border-crossing programs.

RECORD SET IN 1952

The AOPA Registrar's figures show that AOPA's membership continued to grow and reached a new high for 1952. Percentage of members owning their own aircraft is believed to have reached over 70 per cent, breaking by a wide margin all previous figures.

A gradual increase in the average age of members was also noted as well as a continued trend in the direction of four-place aircraft ownership. Almost all AOPA pilots elected to change over to the full type membership and thought is being given to the elimination of the old type limited membership except possibly for members in the military service.

A full report of membership activities which includes triple expansion of most servicing departments will be distributed to members shortly.

NEW EQUIPMENT, FASTER SERVICE

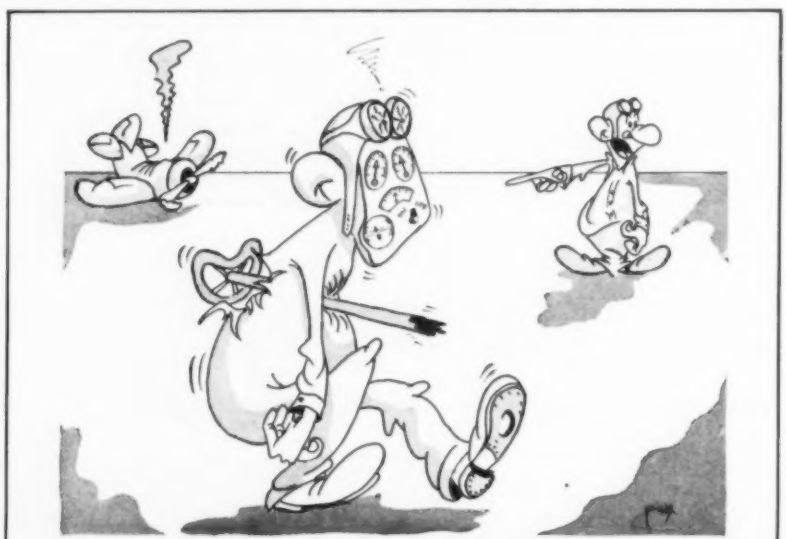
A new program for equipment installation started in AOPA Washington National Headquarters the first week in January. Automatic stencil cutting equipment and other mechanical aids will improve the handling of members' mail and the servicing of their flying problems. A staff of approximately 40 persons now handles the increased volume of mail which sometimes amounts to 1,200 letters a day!

INSURANCE FIGURES WRONG?

With well over three million dollars worth of the AOPA-Minnesota Mutual Life Insurance in force in the second year of the plan, some preliminary conclusions can now be made. It has been the contention of AOPA that life insurance companies should treat travel by personal aircraft as an accepted mode of transportation and that no extra charge should be made for such coverage.

Jointly, AOPA and Minnesota Mutual started a plan to issue group life insurance to interested AOPA members. The response was unprecedented. Many, troubled by lack of life insurance coverage while flying private airplanes, found that they could now obtain coverage at unbelievably low rates ($5,000 insurance for $60 per year). It was an overnight success.

But what would be the claim record? Would aircraft accidents justify the contemporary practice of charging extra rates? A year passed and the answer was definitely "no." The record so far in the second year is further improved. Greatest cause of death? Heart failure! AOPA staff members believe if the record continues as at present, there will be some major actuarial upsets. Meanwhile pilots nationwide are able to solve a real problem through AOPA's group life plan.



"Hey—Joe! Here Comes Another Sale for a Shoulder Harness!"

Coast Guard

(Continued from page 93)

and effort. By clamoring as insistently as possible under the circumstances, the officers managed to borrow one plane. They proved their point in scant time: in August, 1916, Congress authorized the establishment of 10 Coast Guard Air Stations.

But expenses of World War I hindered erection of the first of these, at Morehead City, N. C., until 1921. With a few planes, all borrowed, it was doomed to slow death, from lack of funds.

What gave Coast Guard aviation its first real toehold was, oddly enough, prohibition. By 1926 rum-runners had become so bold that Congress appropriated $152,000 for five planes and two stations.

Today Coast Guard aviation has nine stations and 14 detachments along continental and territorial coasts, and 137 aircraft . . . land, amphibian, sea planes and helicopters. It employs some 12 per cent of the service's officers, mainly as pilots, and 1/20th of its enlisted personnel for support, maintenance and administration.

It has long records of cooperation with virtually every government agency and has saved or assisted in the saving of an incalculable number of lives and amounts of property.

As a service in the Navy during World War II, Coast Guard aviation delivered 61 bombing attacks on enemy submarines; located more than 1,000 survivors of torpedoed ships or ditched aircraft; maintained a squadron (VPB-6, at Narsarssuak, Greenland) that covered a million and a half square miles of arctic waste.

It cooperated with Coast Guard cutters in smashing a Nazi bid to establish a Greenland weather base. In the Pacific it performed air-sea rescues and coastal patrols with the air staffs of every military command.

Aerial Standby

The Coast Guard aviation branch experienced some tense moments not many hours before this was written. At 9:14 in the morning, the pilot of a Military Air Transport Service C-97 radioed that he was about 390 miles southeast of Argentia, with one engine out and another cutting out. At 9:33 a Coast Guard PBY left Argentia. At 9:55 the C-97 radioed "Starting to jettison cargo," and at 10:12, "Most cargo off now."

By then, men on duty at the Coast Guard Eastern Area and Third District Search and Rescue Headquarters at 80 Lafayette Street, in New York City, were computing bearings that had arrived from direction-finder stations in Maryland, Nebraska, Michigan, Georgia, Kentucky and Maine.

At 10:50 the PBY sighted the MATS plane, and commenced its accompanying vigil. At 11:31, the C-97 set down on the runway at Argentia.

What would the Coast Guard plane have done if the C-97 had to ditch into the sea? Just to give an idea, a jet suffered a flameout over the Strait of Juan de Fuca not long ago, and the pilot managed to bail out. Exactly six minutes after his 'chute hit the water, he was in-

CONTINENTAL

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MANUFACTURE OF ENGINES for the use of our Armed Forces is a major phase of Continental Motors' operations, of course. Yet it by no means sums up the company's activities with a bearing on the national well-being, for Continental is also a major source of power for hundreds of civilian jobs vital to our economic strength . . . You find it in leading makes of specialized equipment in construction and industry, and on highway and farm. You find it also in the air. In fact, the majority of all utility planes serving industry and business today—speeding executive travel and getting more things done—fly with dependable, time-proven Continental power.

ESTABLISHED SERVICE FROM COAST TO COAST

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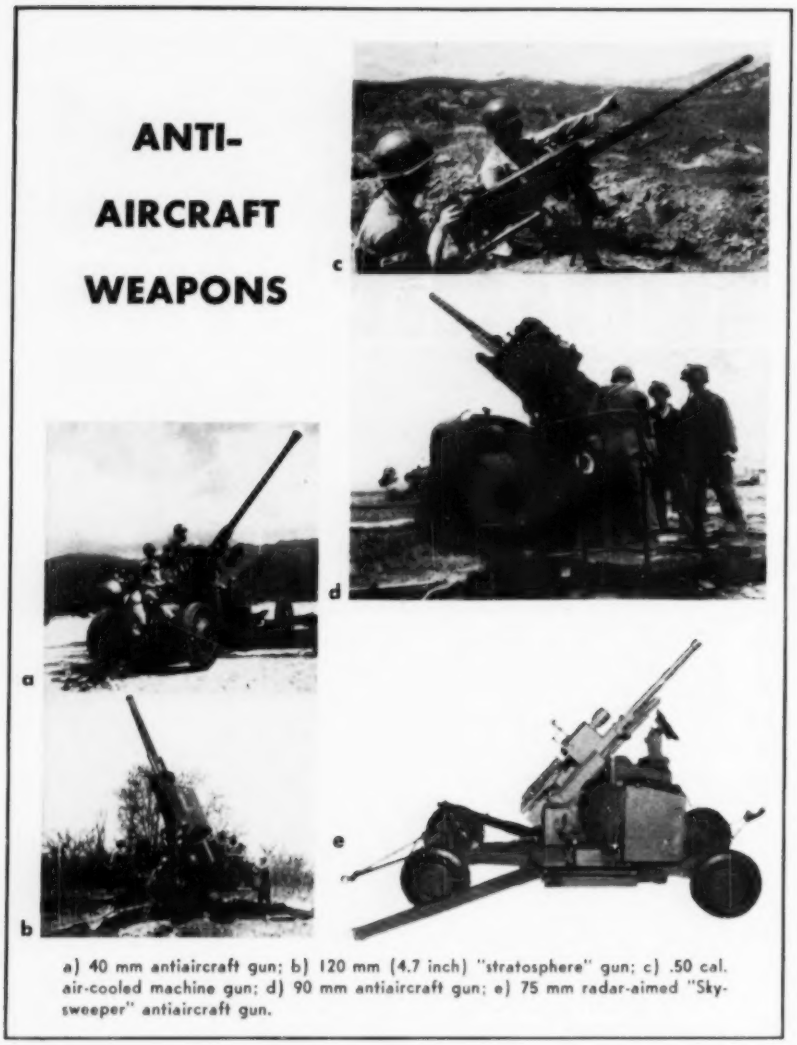

a) 40 mm antiaircraft gun; b) 120 mm (4.7 inch) "stratosphere" gun; c) .50 cal. air-cooled machine gun; d) 90 mm antiaircraft gun; e) 75 mm radar-aimed "Skysweeper" antiaircraft gun.

(Continued from page 103)

side a PBY that happened to be returning from patrol.

More recently than that, in a case you may remember, an Air Force amphibian set down in the Atlantic beside a military transport. It was to take aboard and speed homeward T/Sgt. Charles Buggy. In Sioux City, Iowa, his wife awaited delicate surgery, one of his children was stricken with polio, another dead.

Somehow the transport's metal lifeboat bobbed into one of the amphibian's propellers and damaged it. At Air Force request, a Coast Guard plane left Salem, Mass., flew an 1800-mile round trip, and delivered T/Sgt. Buggy to the B-25 that took him home.

Innovations Welcomed

Coast Guard air, sea and land forces alike have customarily demonstrated a special liking for new methods of rescue. In November, 1943, the aviation branch received some of the first helicopters of American manufacture. They quickly took a lead in novel assists.

Lightning struck two students climbing Mt. Stuart in the Cascades. One was killed, the other burned so badly that cans fused in his pack. A helicopter flew up the side of the mountain and plucked him to care.

A PBM raced in from sea to the Floyd Bennett (Brooklyn) Air Station, returning a victim of peritonitis who was nearly dead. A doctor doubted if the man could last the normal additional hour by ambulance to the Staten Island Public Health Service Hospital. A helicopter had him outside the emergency door in 12 minutes.

Several prisoners escaped in North Carolina. A helicopter pilot took aboard a deputy sheriff with a battery loudspeaker. Whirring above the swamp where the men were hiding, the sheriff persuaded them to surrender.

Two youngsters were stranded on a raft in San Francisco Bay. A helicopter pilot maneuvered his rotor draft to push them ashore.

A helicopter scouted vulnerable ice cracks, helping the Coast Guard Icebreaker *Eastwind* on patrol 442 nautical miles from the North Pole.

There is no limit to the versatility of Coast Guard helicopters. They have been equipped with hoisting winches and pontoons. They have fanned out over isolated valleys to warn of approaching flash floods, performed similarly over thick boating areas in advance of storms, picked imperiled hunters out of duck blinds, removed terrified crewmen from grounded vessels being pounded to pieces.

All this notwithstanding, nobody doubts that the greatest challenge ever met by the Coast Guard helicopter began one afternoon in the fall of 1946 when a heavily-laden foreign airliner crashed in thick woods near Gander, Newfoundland. A ground party actually had to hack its way to the scene. By walkie-talkie, it reported 18 survivors, nearly all in too critical condition for overland removal.

The nearest place where a plane could land was Wolf Lake, three miles away.

A message that lifted many eyebrows went flashing along Coast Guard circuits. At Floyd Bennett in Brooklyn, and at Elizabeth City, N. C., two helicopter crews began a race to see who could quickest disassemble and crate a "windmill." Brooklyn won, by nine minutes. That night helicopters, crews and pilots went in the maw of an Air Force "Flying Boxcar" to Gander. By afternoon of the next day, they were shuttling victims between the crash-site and a PBY on Wolf Lake.

Recognition Won

These and thousands of other contributions to aviation in general have earned the Coast Guard representation on highest levels. As a case in point, a seaplane expert and a helicopter pioneer, both with the rank of captain, were recently reappointed to the National Advisory Committee of Aeronautics.

Also afield, the Coast Guard has for some years, on a more or less experimental basis, conducted at its Brooklyn, Miami and San Francisco air stations a program of training civilian and military air crews in recommended procedures for ditching and similar emergencies.

In Washington recently, at Coast Guard Headquarters, Captain Carl B. Olsen, Chief of the service's Aviation Division, said that such continued response could bring an expansion of the program to additional air stations.

Within its immediate sphere, Coast Guard aviation receives "a very modest number of new aircraft each year" (Captain Olsen) and is gradually assigning aircraft to relatively new, subsidiary Search and Rescue units at such places as Guam, Sangley Point, Midway and Wake in the Pacific, Bermuda and Annette Island, Alaska.

As soon as possible, Coast Guard aviation would like to see all its older planes replaced with the faster and more comfortable modern ones. There is also considerable interest being evidenced in the potential of the larger helicopters, with increased range and pay loads.

Coast Guard aviation will not likely overlook any opportunity to develop a new wrinkle. Off Kodiak Island, not long ago, heavy seas were threatening to smash a grounded vessel. Various rescue craft tried frantically to pass a towing messenger line. They couldn't, the seas were too rough. A PBY did the job. END

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4) Alcedo Model 208 Heavy Duty, made in Italy (not illustrated). Ball Bearings, precision design and workmanship throughout. Reg. $38.50 ..... $34.50

4) Heddon "Sun Pal." Specify 100 or 200 yard capacity Spool, available for right or left handed persons, specify. Reg. $25.00 ..... $22.50

5) Airex "Beachcomber" Salt Water Spinning Reel; sells alone for $28.50 or for $44.50 complete with the $30.00 value Salt Water Rod & Individually Registered 8½ ft. heavy duty 2 pc. 9 ft. length tubular Power Glass Salt Water Spinning Rod. Salt Water Rod and Reel Value is certified to be $58.50, both for $44.50

$34.35 H-I ROD & SHAKESPEARE AUTO FLY REEL $19.95

Reel Separately is $9.35

Pay only $4.00 down and take 6 full months to pay the balance on this great top quality Fly Casting Outfit! Outfit includes: 1. Shakespeare Tru-arc Model 2817 Automatic & Free Stripping Fly Reel. Reel capacity 80 yards "G" line. A flick of the finger automatically takes up the free line. 2. H-I Tubular Power Glass Fly Rod, "Admiral De Luxe" individually Registered and custom-crafted 3 section 8½ ft. Trout or 9 ft. Bass action Fly Rod. Only $5 with the sturdy cloth bag and metal carrying case turn out such magnificent action as you will find in these beautiful Registered Fly Rods. Cloth case and rod tube included. 3. Fly Casting Instruction Booklet.

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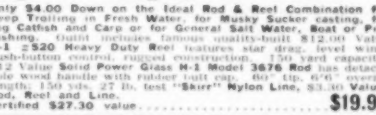
HEAVY DUTY OUTFIT $27.30 Value 19.95



Only $4.00 Down on the Ideal Rod & Reel Combination for Deep Trolling in Fresh Water for Musky Sucker casting, for Big Catfish and Carp or for General Salt Water, Boat or Pier Fishing. Outfit includes famous quality-built $12.00 Value H-I 2-520 Heavy Duty Reel features star drag, level wind, push-button control, rugged construction, 150 yard capacity; $12 Value Solid Power Glass H-I Model 3676 Rod has detachable wood handle with rubber butt cap, for tip, 6'6" overall length; 150 yds. 27 lb. test "Starr" Nylon Line, $3.30 Value. Rod, Reel and Line.

Certified $27.30 value $19.95

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$42.70 PFLUEGER "SUPREME" REEL & BRISTOL GLASS ROD

$34.95

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Both for only $34.95

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$17.70 BAIT CASTING OUTFIT $10.95

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Very Good 6" Webley's 24.95

Very Good to Excellent 6" Webley's 29.95

Add $5.95 for finest hand carved holster.

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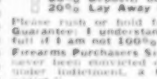

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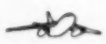
INDEX OF U. S. MILITARY AIRCRAFT

Cross-referenced by popular name, manufacturer, civil designation, and the several military designations. Where a prefix X (experimental) or Y (service test stage) exists before a basic mission letter, index is by basic mission letter. Listings by manufacturer indicate operational status rather than current production.

AD—Douglas Skyraider
1 engine—piston
Navy attack plane

A2D—Douglas Skyshark
2 turbo-prop, coupled
Navy attack plane

A3D—Douglas
2 jet engines
Navy attack plane
Air Force RB-66



AF—Grumman Guardian
1 engine—piston
Navy attack plane

AJ—North American Savage
1 jet, 2 piston eng.
Navy attack-bomber

AM—Martin Mauler
1 engine—piston
Navy attack plane

AU-1—See F4U

Aeronca Aircraft Corp.—
L-16

Albatross—See SA-16

American Helicopter—
XH-26

Army Mule—See HUP-2

Avenger—See TBF

Avitruc—See C-123

B-25—North American Mitchell
2 engines—piston
AF multi-eng. trainer

B-26—Douglas Invader
2 engines—piston
AF light bomber

B-29—Boeing Superfortress
4 engines—piston
AF medium bomber

B-36D—Convair
4 jet, 6 piston eng.
AF heavy bomber

B-45—North American Tornado
4 jet engines
AF light bomber

B-47—Boeing Stratojet
6 jet engines
AF heavy bomber

B-50—Boeing Superbomber
4 engines—piston
AF medium bomber

YB-52—Boeing Stratofortress
8 jet engines
AF heavy bomber

B-57—Martin Canberra
2 jet engines
AF light bomber

B-66—See A3D

Banshee—See F2H

Bearcat—See F8F

Beaver—See L-20

Beech Aircraft Corp.—
C-45, L-23

Bell Aircraft Corp.—
H-12, H-13, X-1, X-2, X-5, XHSL

Boeing Airplane Co.—
B-29, B-47, B-50, YB-52, C-97

Boxcar—See C-82 and C-119

C-45—Beechcraft Expeditor
2 engines—piston
AF transport; Navy JRB; Civil D18S

C-46—Curtiss-Wright Commando
2 engines—piston
AF Transport; Navy R5C

C-47—Douglas Skytrain
2 eng nes—piston
AF transport; Navy R4D;
Civil DC-3

C-54—Douglas Skymaster
4 engines—piston
AF transport; Navy R5D; Civil DC-4

C-74—Douglas Globemaster I
4 engines—piston
AF transport

C-82—Fairchild Packet
2 engines—piston
AF transport

C-97—Boeing Stratocruiser & Stratofreighter
4 engines—piston
AF and Civil transport

C-118—Douglas
4 engines—piston
AF transport; Navy R6D;
Civil DC-6

C-119—Fairchild Packet
2 engines—piston
AF transport; Navy R4Q

XC-120—Fairchild Pack Plane
2 engines
AF exper. transport

C-121—Lockheed Constellation
4 engines—piston
AF and civil transport; Navy WV-1

C-123—Chase Avitruc
2 engines—piston
AF assault transport

C-123A—Chase Avitruc
4 jet engines
AF assault transport

C-124—Douglas Globemaster II
4 engines—piston
AF transport

C-125—Northrop Raider
3 engines—piston
AF transport;
Civil Pioneer

XC-130—Lockheed
4 turbo-prop engines
AF exper. transport

Restricted

C-131—See T-29

Canberra—See B-57

Catalina—See PBY

Cessna Aircraft Co.—
L-19, LC-126

Chance Vought Aircraft Div.—
F4U, F7U

Chase Aircraft Co.—
C-123, C-123A

Commando—See C-46

Consolidated Vultee Aircraft—
B-36D, B-45, T-29, XF-92, XF-102, PBY, PB4Y-2, XP5Y-1, L-5, L-13

Constellation—See C-121

Constitution—See R6V

Convair—See Consolidated Vultee

Convairliner—240/340—
See T-29

Corsair—See F4U

Cougar—See F9F-6

Curtiss-Wright Corp.—
C-46

Cutlass—See F7U

D18S—See C-45

D558—Douglas Skystreak
1 jet engine
Navy research

D558-2—Douglas Skyrocket
Combined rocket & jet
Navy research

(Continued on page 110)

WHY MORE AND MORE
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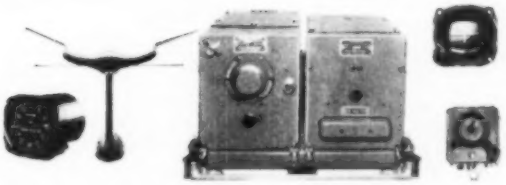
REASON NO. 1 — ARC TYPE 15-D VHF NAVIGATIONAL RECEIVING EQUIPMENT (MILITARY AN/ARN-30A)

108-135 Megacycles



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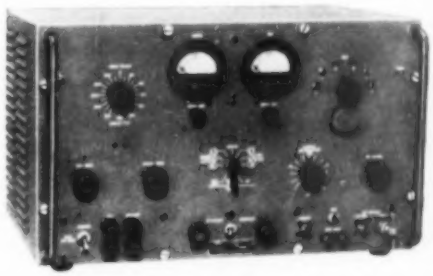

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DC-3—See C-47

DC-4—See C-54

DC-6—See C-118

de Havilland of Canada—
L-20

Delta Wing—See XF-92 and XF-102

Demon—See F3H

Doman Helicopters—
YH-31

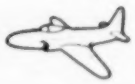
Douglas Aircraft Co.—
AD, A2D, A3D, B-26, C-47, C-54, C-118, C-124, F3D, XF4D, X-3, D558, D558-2

Expediter—See C-45

F-47—Republic Thunderbolt
1 engine—piston
AF fighter

F-51—North American Mustang
1 engine—piston
AF fighter

F-80—Lockheed Shooting Star
1 jet engine
AF fighter-bomber



F-82—North American Twin-Mustang
2 engine—piston
AF fighter

F-84—Republic Thunderjet
1 jet engine
AF fighter-bomber

F-84F—Republic Thunderstreak
1 jet engine
AF fighter-bomber

F-86—North American Sabre
1 jet engine
AF fighter

F-86D—North American Sabre
1 jet engine
AF fighter-interceptor

XF-88—McDonnell Voodoo
2 jet engines
AF fighter-interceptor

F-89—Northrop Scorpion
2 jet engines
AF fighter-interceptor

XF-91—Republic
1 jet eng.; 1 rocket eng.
AF fighter-interceptor

XF-92—Convair Delta Wing
1 jet engine
AF fighter-interceptor

F-94C—Lockheed Starfire
1 jet engine
AF fighter-interceptor

XF-100—North American
AF

Restricted

XF-101—McDonnell Voodoo
2 jet engines
AF fighter-interceptor

Restricted

XF-102—Convair Delta Wing
1 jet engine (?)
AF fighter-interceptor

Restricted

F2H—McDonnell Banshee
2 jet engines
Navy fighter

XF2Y-1—Convair Sea-Dart
2 jet engines
Navy delta-wing seaplane

F3D—Douglas Skyknight
2 jet engines
Navy fighter

F3H—McDonnell Demon
1 jet engine
Navy fighter-interceptor

XF4D—Douglas Skyray
1 jet engine
Navy fighter-interceptor

F4U—Chance Vought Corsair
1 piston engine
Navy fighter-bomber
AU-1 attack version

F6F—Grumman Hellcat
1 engine—piston
Navy fighter

F7F—Grumman Tigercat
2 engines—piston
Navy fighter

F7U—Chance Vought Cutlass
2 jet engines
Navy fighter-interceptor

F8F—Grumman Bearcat
1 engine—piston
Navy fighter

F9F—Grumman Panther
1 jet engine
Navy fighter

F9F-6—Grumman Cougar
1 jet engine
Navy fighter-interceptor

XF10F—Grumman Jaguar
1 jet engine
Navy fighter-interceptor

Restricted

FH-1—McDonnell Phantom
2 jet engines
Navy fighter

FJ—North American Fury
1 jet engine
Navy fighter

Fairchild Aircraft Div.—
C-82, C-119, XC-120

Fury—See FJ

Globemaster I—See C-74

Globemaster II—See C-124

Grumman Aircraft Engin. Co.—
AF, F6F, F7F, F8F, F9F, F9F-6, XF10F, SA-16, TBF, S2F-1

Guardian—See AF

H-5—Sikorsky helicopter
AF & Army; Navy, CG, Marines: HO3S
Civil S-51

H-12—Bell helicopter, transport
AF

H-13—Bell helicopter
Training and utility
AF; Navy HTL; Civil 47D

XH-16—Piasecki helicopter
Transport, tandem rotors
AF & Army exper.

XH-17—Hughes jet helicopter
AF heavy lift exper.

H-19—Sikorsky helicopter
Transport
AF; Navy HO4S; Marines HRS; Civil S-55

H-21—See HRP-2

H-23—Hiller helicopter
Utility & training
AF; Army; Navy HTE; Civil 360

H-25—See HUP-1

XH-26—American helicopter
Pulse-jet, single-place; Army exper.

YH-31—Doman helicopter
Utility
AF exper.

HO3S—See H-5

HO4S—See H-19

HRP-1—Piasecki helicopter
Transport, tandem rotors
Navy and Marines

HRP-2—Piasecki helicopter
Transport, tandem rotors
Navy & Marines; AF H-21

HRS-1—See H-19

XHSL—Bell helicopter
Anti-submarine, tandem rotors
Navy exper.

HTE—See H-23

HTK-1—Kaman helicopter
Training & utility
Navy

HTL—See H-13

HUP-1—Piasecki Retriever
Utility helicopter
Tandem rotors
Navy; AF H-25

HUP-2—Piasecki Army Mule
Utility helicopter
Tandem rotors
Navy, Army

(Continued on page 112)

THEY NEED YOU

A typical interview...

where Embry-Riddle students are pre-selected for essential, good-paying jobs in aviation ***even before*** their training is completed... ***they step right into their jobs as soon as they graduate!***

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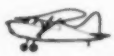
Hiller Helicopters—H-23
Hughes Aircraft Co.—XH-17
Invader—See B-26
JRB—See C-45
JR2F—See SA-16
JRM—Martin Mars
4 engines—piston
Navy transport boat

Jaguar—See XF10F
Kaman Aircraft Corp.—HTK-1

L-5—Convair Sentinel
1 engine—piston
Army & AF liaison
Civil Stinson



L-13—Convair
1 engine—piston
Army & AF liaison

L-16—Aeronca
1 engine—piston
Army & AF liaison
Civil Champion

L-17—Ryan Navion
1 engine—piston
Army & AF liaison
Civil Navion

L-19—Cessna
1 engine—piston
Army & AF liaison

L-20—de Havilland Beaver
1 engine—piston
Army & AF liaison
Civil Beaver

L-21—Piper Super Cub
1 engine—piston
Army & AF liaison
Civil Super Cub

L-23—Beechcraft Twin-Bonanza
2 engines—piston
Army & AF liaison

LC-126—Cessna
1 engine—piston
Army & AF liaison
Civil Cessna 195

Liftmaster—See C-118
Lockheed Aircraft Corp.—C-121, R6V, F-80, XC-130, F-94C, P2V, R7V, T-33
McDonnell Aircraft Corp.—FH-1, F2H, F3H, XF-88, XF-101
Mariner—See PBM
Marlin—See P5M
Mars—See JRM
Martin, Glenn L., Co.—AM, JRM, PBM, P4M, P5M, B-57, RM
Martin 202/404—See RM
Mauler—See AM
Mercator—See P4M
Mitchell—See B-25
Mustang—See F-51
Navion—See L-17
Neptune—See P2V
North American Aviation—AJ, B-25, F-21, F-82, F-86, F-86D, XF-100, FJ, T-6, T-28
Northrop Aircraft, Inc.—C-125, F-89, X-4

P2V—Lockheed Neptune
2 piston or 2 compound eng
Navy patrol bomber

P4M—Martin Mercator
4 eng.—piston combined with 4 jet engines
Navy patrol bomber

P5M—Martin Marlin
4 compound engines
Navy patrol boat

XP5Y-1—Convair
4 turbo prop engines
Navy patrol boat; R3Y transport

PBM—Martin Mariner
2 engines—piston
Navy patrol boat & amphibian

PBY—Convair Catalina
2 engines—piston
Navy patrol boat & amphibian

PB4Y-2—Convair Privateer
4 engines—piston
Navy patrol bomber

Packet—See C-82 & C-119
Pack Plane—See XC-120
Panther—See F9F
Phantom—See FH-1
Piasecki Helicopter Corp.—XH-16, HRP-1, HRP-2, HUP-1, HUP-2
Piper Aircraft Corp.—L-21
Pioneer—See C-125
Privateer—See PB4Y-2
R3Y—See XP5Y-1
R4D—See C-47
R4Q—See C-119
R5C—See C-46
R5D—See C-54
R6D—See C-118

R6V—Lockheed Constitution
4 engines—piston
Navy transport

R7V—Lockheed Super-Constellation
4 piston or compound engines
Navy transport. Radar version is WV-2

RM—Martin 202 and 404
2 engines—piston
Navy transport; Civil trans.

Raider—See C-125
Republic Aviation Corp.—F-47, F-84, F-84F, XF-91
Rescuer—See HRP-1
Retriever—See HUP-1
Ryan Aeronautical Co.—L-17

S2F-1—Grumman
2 engines—piston
Navy anti-submarine

S-51—See H-5
S-55—See H-19

SA-16—Grumman Albatross
2 engines—piston
AF search & rescue
Navy & CG: UF & JR2F

SNJ—See T-6
Sabre—See F-86 & F-86D
Savage—See AJ
Scorpion—See F-89
Sea-Dart—See XF2Y-1
Sentinel—See L-5
Shooting Star—See F-80
Sikorsky Aircraft—H-5, H-19
Skyknight—See F3D
Skymaster—See C-54
Skyraider—See AD
Skytrain—See C-47
Skyray—See XF4D
Skyrocket—See D558-2
Skyshark—See A2D
Skystreak—See D558
Starfire—See F94C
Stinson—See L-5
Stratocruiser—See C-97
Stratofortress—See YB-52
Stratofreighter—See C-97
Stratojet—See B-47
Superbomber—See B-50
Super Constellation—See R7V
Super Cub—See L-21
Superfortress—See B-29

T-6—North American Texan
1 piston-engine
AF trainer; Navy SNJ

T-28—North American
1 engine—piston
AF trainer

T-29—Convair
2 engines—piston
AF nav. trainer; AF C-131 transport; civil 240/340

T-33—Lockheed
1 jet engine
AF trainer; Navy TO-2

TBF—Grumman Avenger
1 engine—piston
Navy torpedo bomber
General Motors built TBM

TBM—See TBF
TO-2—See T-33
Texan—See T-6
Thunderbolt—See F-47
Thunderjet—See F-84
Thunderstreak—See F-84F
Tigercat—See F7F
Tornado—See B-45
Twin-Beech—See C-45
Twin-Bonanza—See L-23
Twin-Mustang—See F-82
UF—See SA-16
Voodoo—See XF-88 & XF-101
WV-1—See C-121
WV-2—See R7V

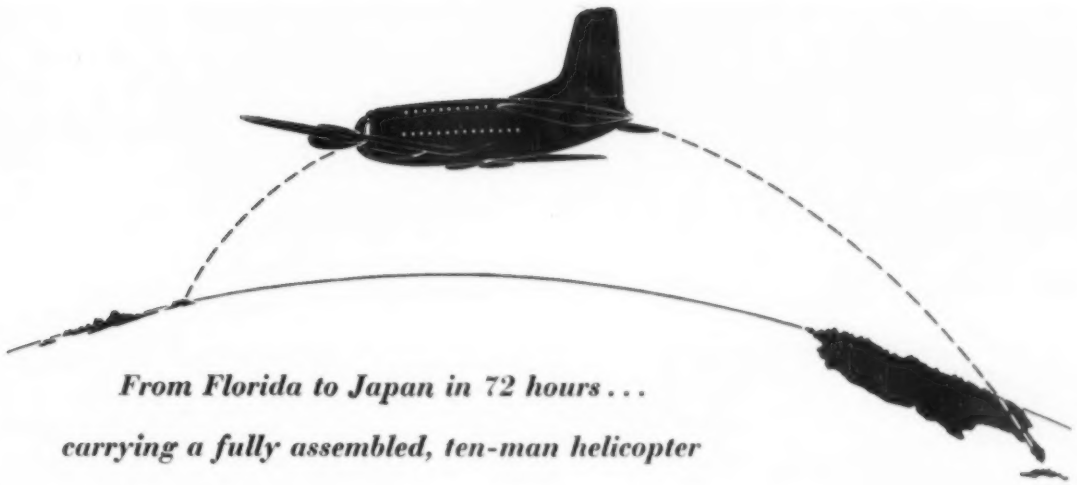
X-1—Bell
Rocket Power
AF supersonic research

X-2—Bell
Rocket Power
Supersonic research
Restricted

X-3—Douglas
Various jet engines
High speed research
Restricted

X-4—Northrop
2 jet engines
AF research

X-5—Bell
1 jet engine
Research



From Florida to Japan in 72 hours . . .

carrying a fully assembled, ten-man helicopter

—the DOUGLAS C-124 Globemaster

From the front lines in Korea last year came calls for a 10-man helicopter. The Air Force had some, but they were in Florida—9,000 miles away.

Normal air transport could make the *flight* in time, but tearing down a helicopter—reassembling it in Korea—would waste a week. So the Air Force turned to a Douglas C-124 Globemaster, the flying giant that covers thousands of miles nonstop with a 25-ton payload. Globemaster opened its clam-shell doors and swallowed the helicopter whole, took off, and reached Japan in 72 hours. Next day, at the Korean front, our men had the helicopter they needed.

Performance of the Globemaster in action is another example of Douglas leadership in aviation. *Faster and farther with a greater payload* is a basic of all Douglas design.

Depend on *DOUGLAS* First in Aviation

PRODUCING
for today...
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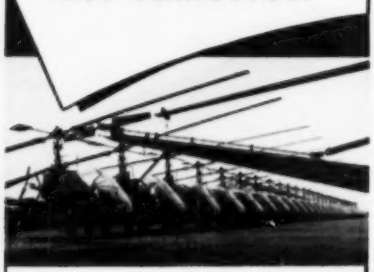
for tomorrow



This headline tells the story! Hiller Helicopters is presently giving its full energies to Armed Forces production . . . to keep our Military Services properly equipped.

However, we are also building and working toward a better tomorrow. Our engineers are already at work on plans for new Rotary Wing advances which will set the pace for tomorrow's commercial helicopter development.

Look to Hiller—one of the oldest, and best known names in Rotary Wing production — to continue a position of leadership in the helicopter field!

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FLYING FARMERS

By BILL RENSHAW

FF'S IN CIVIL DEFENSE

Flying Farmers have a great Civil Defense potential. If World War III were to break on us tomorrow, it would find the farm folks of our land better able to do their part than at any time in history.

Farmers of the U. S. have made great strides in the last 10 or 15 years. They have doubled production of both food and fiber when it needed to be doubled. They have the know-how to well nigh double it again, at least for brief periods.

Since the close of World War II, many farmers have added an airplane to their farm implements. With these airplanes farmers have practiced well the pursuits of peace. They now form a great Civil Defense force, needing only to be thoroughly trained and supervised.

Dispersed as they are in pastures throughout the nation, they would escape the blows sure to fall on our big airports, both civil and military.

As of today there seem to be two factors that might cause us to lose this great pool of private planes.

1) The failure of certain military leaders to recognize that these "cow pasture planes" might well play a tremendous role;

2) The failure of Flying Farmers to get ready, and now, and to let the military know they are ready.

A hurried survey by this columnist, reaching into every corner of our nation, found Flying Farmers ready to a man to do anything they might be asked to do.

It must, however, be reported that if we were to be attacked tomorrow less than 25 per cent of our Flying Farmer airplanes would be scheduled for immediate Civil Defense chores.

In spite of some well organized areas, the situation is generally spotty, although Flying Farmers were demonstrating the Civil Defense utility of the lightplane as much as two years back.

Indiana Flying Farmers, for instance, staged a mock flight on January 21, 1951. The flight took off from Warsaw, Ind., on word that Fort Wayne had suffered a simulated attack. Thirty-two minutes later the last plane of a flight of 50 landed at Fort Wayne. They carried doctors, nurses and blood plasma. This dry run was considered extremely successful by local Civil Defense officials.

Virgil Joyce, Indiana FF president, says that immediately following this exercise 99 per cent of the FF's in the area volunteered for Civil Defense in case of attack.

Illinois FF's quickly followed with a well organized flight to Peoria. Local Civil Defense officials were quick to visualize the potential. The practice flight was held in April of '51. Despite crossed-up radio announcements and extremely strong winds, 109 planes flew in carrying 23½ tons of simulated supplies and 17 medical personnel. Elmer Pattison, Illinois FF president, along with four key FF's, were commended by state defense officials.

Iowa folks seem to have demonstrated rather fully what a fine carrier of supplies the private plane can be, according to President Elmer J. Paul. Paul reports that in July, '51, 309 planes transferred 110,000 pounds of simulated supplies to a grass field adjacent to Cedar Rapids.

The speed with which Flying Farmers could be mobilized is another invaluable asset. Bert A. Hanson, Minnesota FF president, estimates that all Flying Farmers in his area could be on mission within an hour.

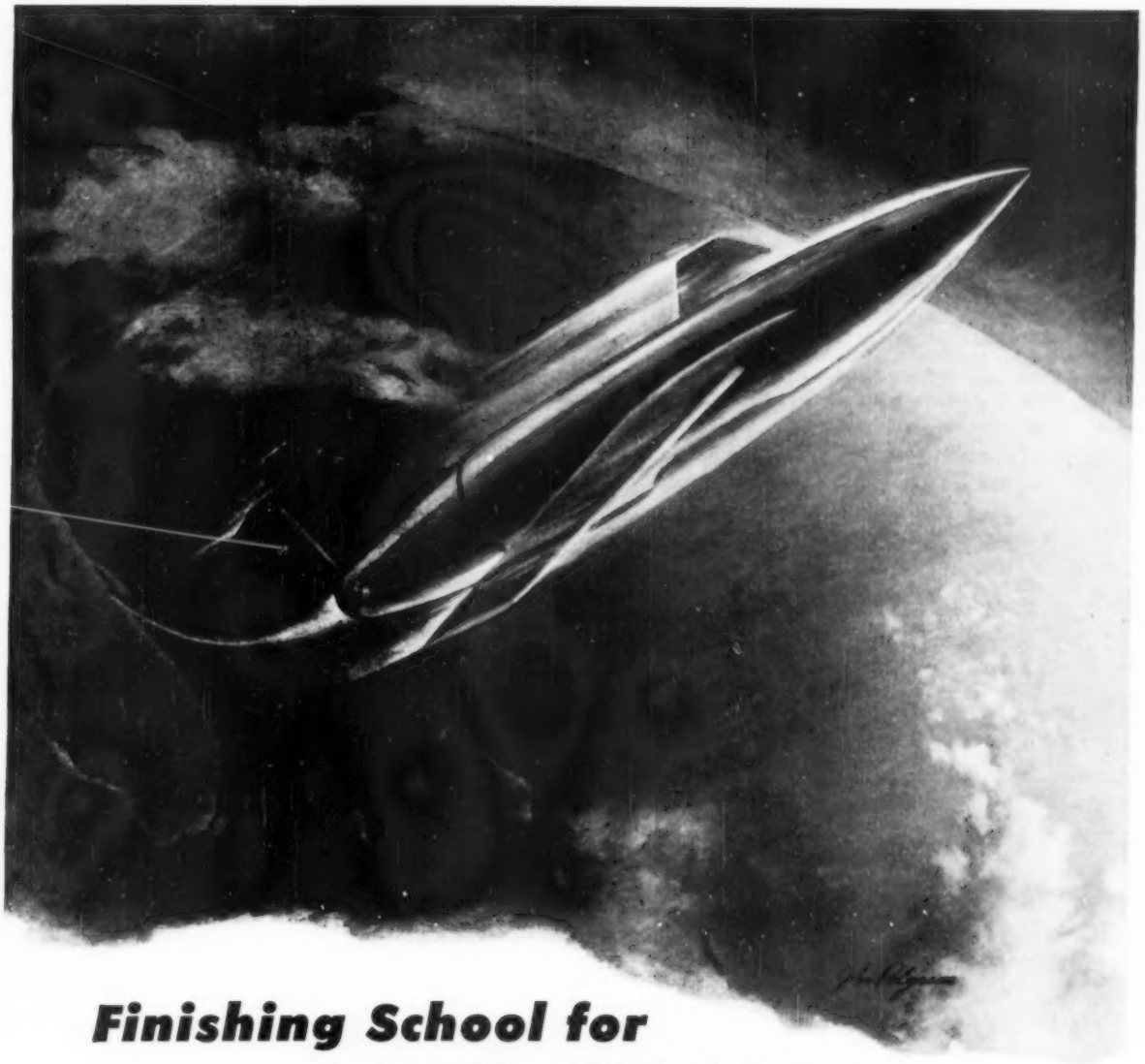
Need for organization and advance planning is mentioned by the Michigan FF president, who says: "Let's tell the people what we can do with our planes, and let's find out what we as Flying Farmers are supposed to do in case of attack."

Wyoming, with a well organized group of 225 Flying Farmers, is ready to go at almost a moment's notice, according to Maurice Fausset, president, who reports that more than 50 per cent of the planes are equipped with two-way radios and that 80 per cent of the state's FF's are registered with Civil Defense.

Bert A. Hanson sums up the case, saying: "Certainly no group in the world would be as handy as Flying Farmers in case of attack." Bert points out that FF's, accustomed to short landing strips, could get in with supplies on strips so short that the average pilot would not think of landing.

The dependability of Flying Farmers is stressed by Ken Wyckoff, National Flying Farmer director for District 3. Wyckoff says no one has ever found a communist among Flying Farmers and never will. "Flying Farmers," Wyckoff concludes, "own their farms, their airplanes and their souls—they are red-blooded Americans."

Wyckoff's views are echoed by Fred Triplett, NFFA Secretary, who declared: "This nation can depend on Flying Farmers in case of a national emergency."



Finishing School for GUIDED MISSILES

The Air Force Missile Test Center, used by all our military services as a long-range proving ground, stretches thousands of miles from Florida, out over the Bahamas, into the South Atlantic.

A pilotless bomber roars away from its launching stand, picks up speed, zooms into the blue. Setting its course for a far-off target in the ocean, it rockets over a chain of tiny islands where men and machines check its flight, its behavior, the operation of its guidance and control systems. It's a vital part of our air power of the future—an aeronautical research and development program that is laying the foundation for continued U. S. air supremacy!

Operated by the USAF's Air Research and Development Command, the Missile Test Center is geared up to test the wide variety of missiles, rockets and pilotless aircraft vital to modern air power. It reached its full stature with the recent completion of down-range observation stations. And the dramatic B-61 pilotless bomber, the Matador, designed and produced by Martin as part of its diversified missiles program, was the first to use the completed range.

Martin AIRCRAFT

THE GLENN L. MARTIN COMPANY
Baltimore 3, Maryland

Five Hundred-Mission Pilot

Bill Gutches ran away from home 13 years ago. His folks, back in Paterson, N. J., couldn't go along with their 16-year-old son's passion for airplanes.

Today, two wars later, Bill is back on home ground in New Jersey. The folks eventually accepted Bill's flying, and came to share the nation's pride in the first American airman ever to log 500 combat missions. His closest rival in the "most mission" sweepstakes has a commendable score of 357.

Five hundred missions, you're thinking. "Wow, this Gutches must be the original Superman!" You'd be closer to the mark if you quoted his own description: "I guess you'd call me the average American type."

At age 29, Captain Bill Gutches stands five feet, 11 inches, and weighs 190 pounds. He has reddish hair, freckles, and a lopsided grin. He's been married for nine years and he and his wife, Lillian, make their future plans around six-year-old William H. Gutches, Jr.

Bill, Sr., was 14 when he started to fly. Every night after school he'd work four or five hours around the local airport, then go back there to work all day Saturday. His payment was one hour of flight instruction per week. A fair bargain, thought Bill, but his parents disagreed and after two years Bill struck out on his own.

There was no let-up in the flying lessons as Bill continued his studies and graduated from Paterson High School. In 1942, when he was 19, he enlisted in the Air Force and eventually the wings of an airman were his.

"I immediately requested overseas assignment," says Bill, "and was ordered to the First Combat Group in the China-Burma-India Theater."

Around the Far Eastern Theater Bill flew 425 official missions, in B-25's, C-47's, PT-19's and CG4A's. He doesn't blame any over-zealous scheduling officer for his unparalleled number of assignments. "I couldn't get enough," he admits.

Gutches left the Air Force temporarily in 1946, and as a civilian joined the New Jersey Air National Guard and attended Air Tactical School at

Capt. Bill Gutches

Tyndall Air Force Base, Fla., and Officers' Armament School, Lowry AFB, Colo. Between training periods he flew for various non-scheduled airlines until March, 1951, when his unit, the 108th Fighter Wing, was called into active service.

Five months of Stateside "inactivity" followed, so Bill requested combat crew training and a tour in Korea. He was transferred to Langley AFB, Va., where he assembled his crew.

In Korea, the crew was attached to the 67th Tactical Reconnaissance Group. "Our equipment was Douglas RB-26's, which we loved," says Gutches. "Though guns would have been welcomed many times, we had a comparatively easy time of it. We managed to get into a few unpleasant spots, but none of us were wounded. We were shot up, but never down, as the saying goes."

Bill flew 55 missions with his crew, then flew 20 more with other airmen. His final combat mission was flown last May 1. With Mission Number 500 under his belt, he headed back for the U. S.

Was he through with flying? He's now a jet fighter pilot, attached to the Fifth Fighter Interceptor Squadron of the Air Defense Command at McGuire AFB, not far from his home in New Jersey. END

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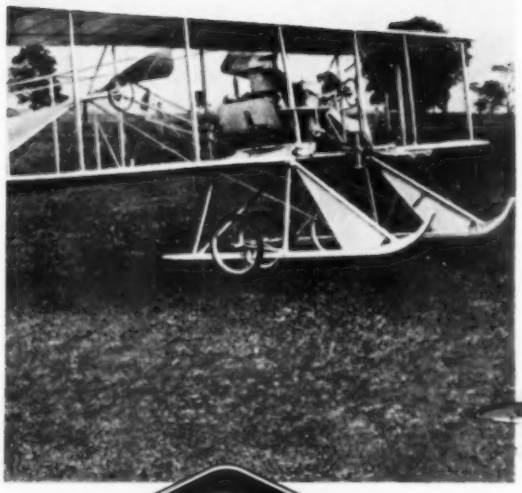

TIME WAS when planes landed and took off on uncushioned "skids" or "sled-runners." Some early fliers even tried using bicycle wheels with single-tube bicycle tires cemented to the rims—with unfortunate results. Then Goodyear changed all that.

In 1909, Goodyear developed the first pneumatic aeroplane tire, of the type attached to the sled-runners of the Burgess-Wright biplane shown here. Harry Atwood, the pilot, made this report after his World's Record Long-Distance Cross-Country Flight from St. Louis to New York (15 days): "I was often obliged to land in rough, unfavorable places, but your 20 x 2 inch Wing tire gave me no trouble at all."

GOODYEAR AVIATION PRODUCTS

AVIATION 50th ANNIVERSARY GOODYEAR ONE OF THE PIONEERS

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These are just a few of the many Goodyear Aviation Products which are serving aviation today. Goodyear has been contributing to aviation progress since 1909.

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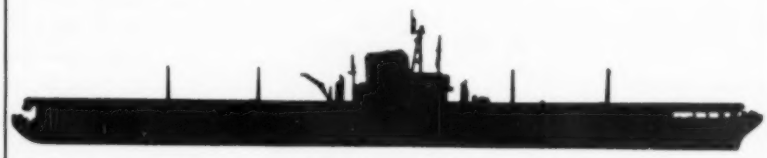
COMBATANT SHIPS OF THE NAVY

Ships pictured below are types currently in service. Within 10 years, the combatant fleet is also scheduled to include 10 additional carriers. Two of these, the flush-deck, 60,000-ton Forrestal *and* Saratoga, *are already under construction.*



CVB—Aircraft Carrier, Large—Midway Class—45,000 tons, 968 feet.

CV—Aircraft Carrier, Essex Class, Oriskany Type—30,800 tons, 888 feet.

CVL—Aircraft Carrier, Small—Saipan Class—14,500 tons, 684 feet.

CVE—Aircraft Carrier-Escort—Commencement Bay Class—24,100 tons, 557 feet.

BB—Battleship—Iowa Class—45,000 tons, 890 feet.

CA—Heavy Cruiser—Des Moines Class—17,000 tons, 717 feet.

CL—Light Cruiser—Cleveland Class—10,000 tons, 608 feet.

DD—Destroyer—Fletcher Class—2,050 tons, 376 feet.

SS—Submarine—"Guppy" Class—1,570 tons, 311 feet.

Heartbeats in Steel!
Like a stethoscope, AiResearch test equipment senses every factor bearing on performance to assure top quality of AiResearch components!
GAS TURBINE TEST RUN
While running at 40,000 rpm, this AiResearch gas turbine is checked out simultaneously for these factors:
Temperature: Enclosure inlet, Compressor inlet, Compressor outlet, Combustion, Turbine discharge, Cooling air, Oil pump outlet, Oil tank, Bearings, Skin.
Pressure: Enclosure inlet, Compressor ratio, Fuel pump inlet, Fuel nozzle, Turbine discharge, Oil, Cooling air, Governor air.
Other tests: Bleed air flow, Vibration, Starter voltage and amperage, Fuel flow, Cooling air flow, Shaft power, Turbine speed, Test time.

During this test run an AiResearch auxiliary gas turbine is probed, measured and checked for twenty-seven factors of temperature, pressure, speed and power. The welter of surrounding lines and tubes tell their own story of the exhausting care taken to insure that this vital aircraft component is in perfect condition.

Twenty-nine similar test cells and dozens of other research installations are in constant use in the AiResearch laboratories perfecting hundreds of precision products. Here, for example, turbine wheels are operated at speeds of 160,000 rpm. Temperatures measured accurately from −150°F to +3,000°F... vibration acceleration up to 100 Gs... sound up to 200 db.

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NATO Air Defense

(Continued from page 95)

being overtaken by technical progress and were falling below standards required for highest interceptor performance.

Belgian and Dutch squadrons have been equipped mainly with *Meteors;* the French and R.A.F. with *Vampires;* and the U.S.A.F. with *Thunderjets.* All of these aircraft have for some time been obsolescent as interceptor fighters and lack the speed and punch of high altitude aircraft like the U.S. *Sabre* or the Russion MIG.

That picture is, however, now to be changed, and changed rapidly. Inter-Allied planning, which has coordinated British and Canadian production resources, and the foreign procurement program of the United States, is to result in the re-equipping of all the National Forces involved. Between 300 and 400 F-86 *Sabres* built in Canada, financed by the U.S.A.F., and manned by the R.A.F., are to take over top-cover air defense in Germany under England's Air Marshal Sir Robert Foster. Meanwhile, in the Metz area of the Franco-German border, new *Sabre* squadrons of the Royal Canadian Air Force are already standing guard.

This huge European air re-armament is a remarkable piece of international planning.

The Allied Air Forces of Central Europe come under command of General Lauris Norstad, U.S.A.F., who is directly responsible to General Matthew B. Ridgway of SHAPE, whose Aid Deputy is Air Chief Marshal Sir Hugh Saunders of the R.A.F. Norstad's headquarters are at Fontainebleau, France, and there he has an integrated staff of senior officers from all NATO countries involved. His Chief of Staff is a French General, and his Operations and Administrative deputies are respectively British and American. A Canadian Air Vice Marshal is in charge of logistics, the all-important standardization of equipment.

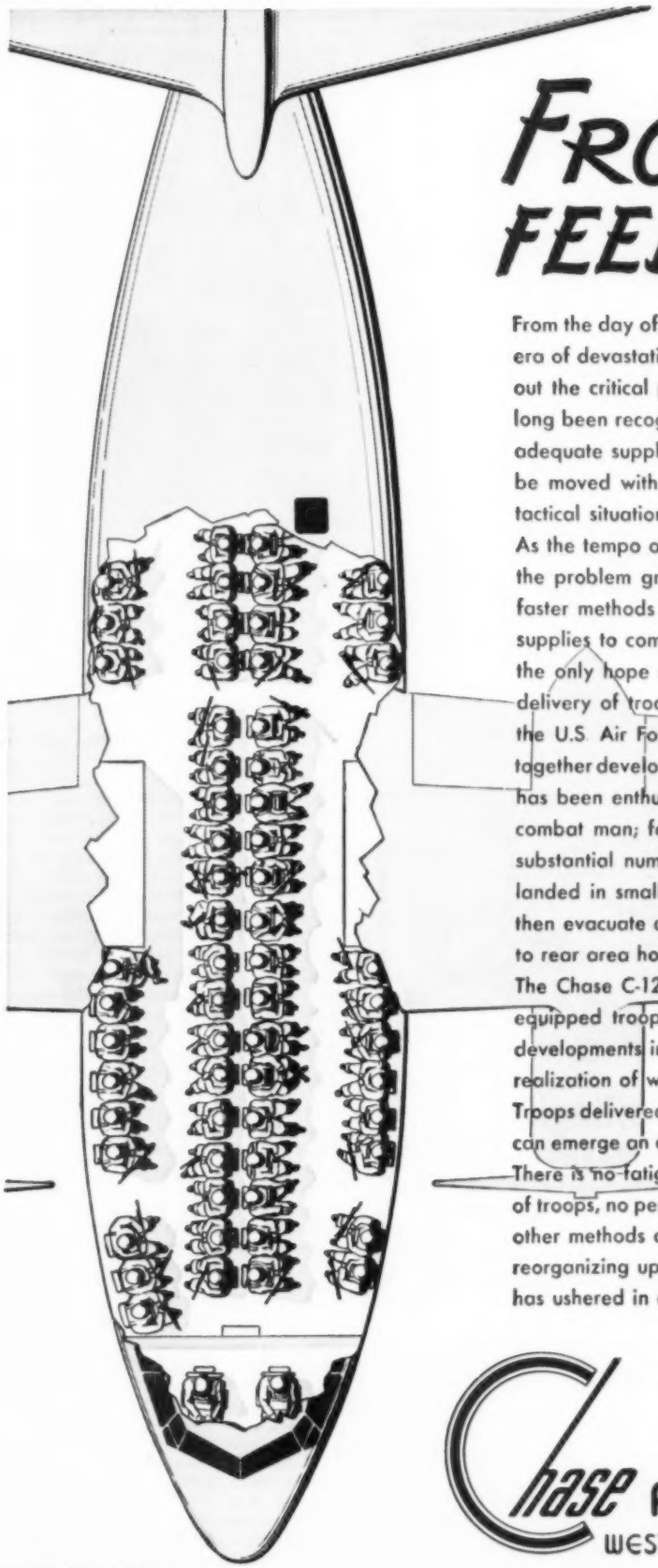
General Norstad has, in the field, two Tactical Air Forces—the Second Allied T.A.F., and the Fourth Allied T.A.F. The "Second" is a grouping of British, Belgian and Dutch and the "Fourth" comprises the Canadians, Americans and French.

All these arrangements, which give Europe a clean-cut Air Defense Organization, are already in being, and the units operational in their roles. What is being done to give them modern weapons?

The Canadian factory of Canadair at Montreal is in full production on the U. S. *Sabre,* now using American engines, but later planning to substitute the Canadian Avro-Orenda. The first planes were delivered in December; all will be in the field during 1953.

Venoms on Horizon

The R.A.F. in Europe will man all these F-86's and at the same time retain its present squadrons of *Vampires.* These will relinquish their "fighter" role, and concentrate on the tactical work of fighter-bombing. In addition, the R.A.F. will be further strengthened by the *Vampire's* successor, the *Venom,* a high performance



FRONT LINE FEEDER LINE

From the day of spear and shield combat to the present era of devastating weapons, military men have sweated out the critical problem of logistics. It has long been recognized that wars can only be won when adequate supplies of manpower and materiel can be moved with sufficient speed to meet any tactical situation.

As the tempo of warfare increased through the years, the problem grew more critical demanding newer and faster methods of delivering troops, weapons and supplies to combat areas. Firm in their belief that the only hope of solving this problem lay in the delivery of troops and equipment by air, the U.S. Air Force, Army and Chase Aircraft working together developed the assault transport. Its development has been enthusiastically received by the combat man; for today, fresh troops can be rushed in substantial numbers to forward combat areas and landed in small unimproved fields. The planes can then evacuate casualties direct from front lines to rear area hospitals.

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RECORD BREAKER

AF Capt. Slade Nash takes time out for refreshment after gunning a North American F-86D *Sabre* to a record speed of 699.9 mph over a three kilometer course on the northeastern shore of California's Salton Sea. Nash is a test pilot at Edwards Air Force Base.

aircraft of considerable versatility. The first *Venom* squadrons are already equipped.

From now on, therefore, the R.A.F. in Europe will get progressively stronger, both in numbers and in equipment.

The Dutch and Belgian *Meteors* will continue as tactical aircraft, until replaced by the new super-priority Vickers *Swift* fighter, large numbers of which are in allied procurement plans. The *Swifts* will be built in Britain, Belgium and Holland, and should be in NATO squadrons by 1954. NATO therefore is within measurable distance of having its second Allied T.A.F. equipped with *Sabres, Swifts, Venoms* and *Vampires*, plus the appropriate night-fighters, either *Meteors* or *Venoms*.

The Fourth Allied T.A.F. already has three squadrons of R.C.A.F. *Sabres;* will have three more by spring, and a total of 12 by 1954. The fighter-bomber role is already in the hands of the U.S.A.F. F-84 *Thunderjets*, and the major re-equipment still to be done is that of the French *Vampire* squadrons.

The plan at SHAPE is for the French-built swept-wing *Mystere IV* to take over —and it is believed that up to 250 of these aircraft are likely to be ordered. The French will, presumably, also order some for themselves.

The *Mystere* is a first-class machine, with a speed well above the 650 mph range. Big production of this aircraft will stimulate the French industry and provide Europe with a valuable source of production.

All this now combines into a heartening picture. There are problems and there will be more, but the big over-all plan is now clear, and from now on each month will see the European Air Forces a tougher and rougher proposition to challenge. END

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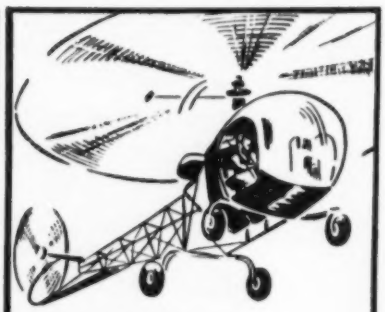

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I Learned About Flying

(Continued from page 98)

through turbulence and rain with light icing. Finally the Macon beam came in, static-ridden but distinguishable and I checked the weather again. The front seemed to be gliding past Atlanta. Pretty soon a few breaks in the clouds appeared and the Colonel rang up to ask if I wanted a cigar. By that time the cockpit looked like a pool room on Saturday night, so I decided to smoke in self defense.

Twisting in my seat, I reached back over my shoulder for the stogie. I'd taken off my headset for this operation and after lighting up I dialed the Atlanta beam and put back the ear phones. They were ominously quiet. I checked the connections. Just then we hit some more turbulence and the clouds closed in again. Groping around on the floor, I tried to find my radio trouble. When I found it, the cigar went out the window.

The cable connection to the radio receiver was torn loose. I must have ripped it out with my foot as I reached for the Colonel's offering. That added up to an AT-6 somewhere between Macon and Atlanta, 100 per cent on instruments, at night, no radio receiver, and about an hour and a half of gas.

Go On, and Hope

The last weather I'd picked up showed Macon and Jacksonville closing; Atlanta and Birmingham getting better. I figured I must be almost through the front, and the best thing to do was go on and hope something was wide open behind it.

I'd checked the wind and headings at Macon and so had a dependable ETA to Atlanta. But as it ran out the clouds were solid as ever and I didn't relish letting down blind. There is a 2,000-foot mountain just north of Atlanta. I still had enough gas to run up to Birmingham which certainly should be open. I dead reckoned my way up there, found it tighter than a drum and headed back for Atlanta.

My transmitter was still working and I aired my plight to anyone who was interested. Back over where I hoped Atlanta was I searched for breaks in the clouds. I decided to keep this up for 15 of my remaining 30 minutes of gas and then invite the Colonel to join me in bailing out. I wondered idly if the Colonel would smoke on the way down.

At zero hour minus three minutes I spotted a faint glow through the clouds. I knew CAA would have cleared out all flights from below me so I decided to risk a letdown. Starting at 4,000 feet I started easing down. At 3,000 the glow was tantalizingly brighter. I dropped the nose again. At 2,000 the clouds beckoned wraithlike and I continued the letdown, holding my breath now. That mountain was somewhere nearby. At 1,000 feet lights seeped through the clouds and I decided by circling down I'd minimize the chances of hitting the mountain.

I slid lower. Rain was pelting the ship. The needle slipped past 800, 700. I sat

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a) High explosives on the rack, seen through the bomb bay; b) Napalm bombs; c) Republic F-84 loaded with 5" HVAR rockets; d) High explosives; e) .50 cal. machine gun bullets; f) Loading .50 cal. machine gun bullets; g) F-84E loaded with "Tiny Tims" of 1,200 lbs. each.

tense in the cockpit ready for a fast pull-up. Suddenly I broke through. It was raining hard but I could make out lights and buildings. Then dead ahead, like the lamp in the window, I saw a lighted runway. I got a green light as I went by, flashed through a check list, and a minute later skittered to a stop on the parking ramp.

Still Smoking

I climbed out, my knees quaking. I'd all but forgotten about my passenger but as I hit the cement the back canopy opened and he popped out, shielding his cigar with his hand. I wondered if he knew how close he'd been to getting his first parachute jump with his first airplane ride.

But he was all smiles, telling me how great it was—and how did I ever find that runway on a night like this? I saluted as the command car whisked him away.

When I got inside I found I'd landed at the Naval Air Station and that sure enough the whole countryside had been alerted to be on the lookout for me. After turning in my clearance and attending to the paper work I thankfully headed for the sign which read "transient officer quarters."

As I passed the weather office, which in the Navy is called the Aerologists, the fellow glanced up and said, "Going back tonight, sir? It's clearing up nicely. Jacksonville is opening and Sebring is clear." It was a wiser I who replied, "No thanks, a flight like that's got no insurance." END

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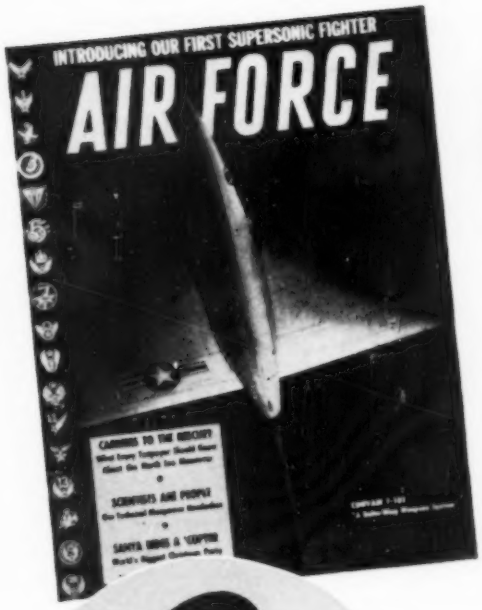

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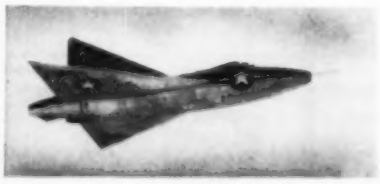

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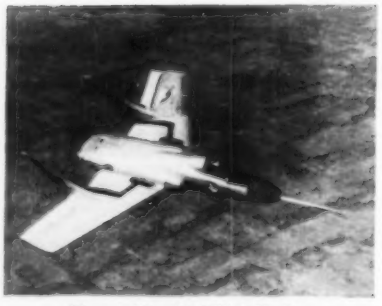

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Iven has been an AOPA member since 1948 and holds a commercial ticket with single and multi-engine, land ratings. He once owned a PT-17 and has over 700 hours of civilian time. He is now stationed at Nellis Air Force Base in Nevada and hopes to get another private aircraft in the near future.

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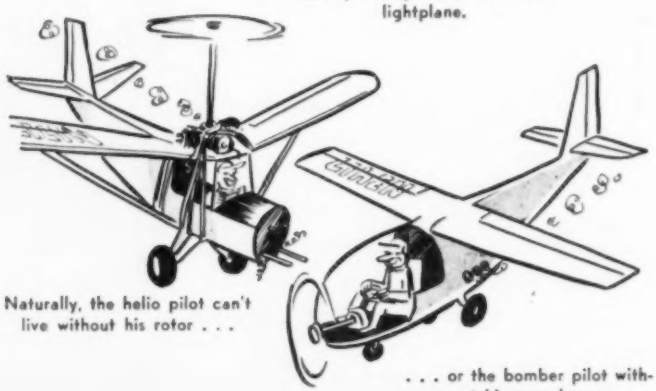
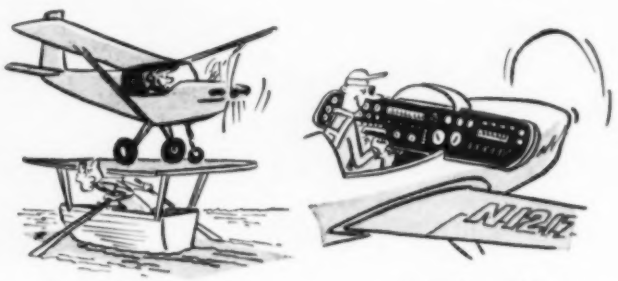


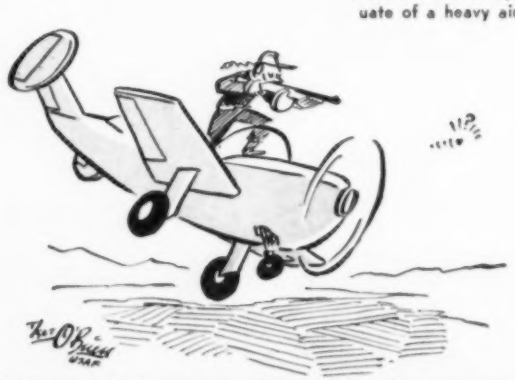
Naturally, the helio pilot can't live without his rotor . . .

. . . or the bomber pilot without his greenhouse.



The carrier boy.

A simple panel has no appeal for the instrument-happy graduate of a heavy aircraft.



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IT SEEMS TO US: There is a good supply of most civilian types of airplanes on the used market, and prices are slightly lower than last Fall. Aircraft representing the best values should gradually leave the market as spring approaches, and so this is an advantageous time to purchase.

BEECHCRAFT BONANZAS: 33 available. Painted 1947, #8044TF, has 250 hours since overhaul. Extra tank, gyros, omni, etc. $7000. Also; 1948 A-35, #495BF, with 432 hour 1950 205 HP. engine. Gyro. Omni. $9000. Also; painted 1950 B-35, #874QAF, with 200 hours since overhaul. Extra tank. Gyros. Omni. Exceptional. $13,000. Also; painted 1951 C-35, #64TDF, with 100 hours since overhaul. Gyros. Omni. Bargain. $14,250.

BEECHCRAFT STAGGERWINGS: 8 available. Exceptional pre-war 205 HP., #1707GF, has only 520 hours. Refinished August. Gyros. Radio. All bulletins. Undamaged. Bargain. $2900. Also; several excellent 450 HP. D17S models.

BEECHCRAFT TWINS: 21 from $22,350. D18S 1947, #9050XF, has new engines and hydramatics. Extra tank. De-icing. Windshield wipers. Oxygen. Exceptional radio. Three seats and couch. Will re-license. Beautiful. $64,700.

BELLANCA CRUISAIRS: 17 from $3000. 1946, #8686RF, has 80 hours since overhaul. Aeromatic. Primary blind. Radio. $3300. Also; 1947, #7443ZF, with new engine. Aeromatic. Heater. Gyros. Omni. Many extras. Fabric excellent. Exceptional. $4500.

BELLANCA CRUISMASTERS: 3 available. 1950, #658JNF, has only 140 hours. Auxiliary tank. Gyro. Omni-range. Beautiful. Bargain. $9750.

CESSNA 170'S: 21 available. Late 1948, #4132VF, has 324 hours since overhauled. Crosswind gear. Metal propeller. Gyros. Omni. Loop. $3750. Also; July 1950 all metal, #990PAF, with 100 hours since overhaul. Metal propeller. Gyro. Omni. Bargain. $5000. Also; 1952 170B, #168GDF, with 225 hours. Metal propeller. Primary blind. Radio. $7200.

CESSNA 195'S: 11 from $11,000. 1949 300 HP., #388SVF, has 5 hours since overhaul. Gyros. Omni. Lear-12 ADF. Bargain. $12,000.

CESSNA TWINS: 8 from $2000. #6022SF has 230 hours since recovered 1949. Engines 330 total hours. Propellers 110 hours. Flares. Outside baggage door. Gyros. ADF. Relicensed October. Excellent. $2200.

CONSOLIDATED PBY-5: #4000QBF has zero time since complete overhaul. Clipper bow. Tail modified. Controls moved to pilot's compartment. Stainless firewalls. Auto-pilot. Relicensed. Exceptional. $40,000.

DeHAVILLAND BEAVER: 1950, #149XVF, has only 332 hours. 2 crew and 4 passenger seats. Gyros. Oxygen. Omni. ADF. Excellent. $32,500.

DOUGLAS DC-3'S & C'47'S: Large selection from $66,000. Converted C-47, #995TFF, has 950 hours since major overhaul. Engines and propellers 35 hours. 21-seat deluxe passenger interior. Heavy floor and landing gear. All bulletins. Relicensed December. Exceptional. $95,000. Make offer.

GRUMMAN WIDGEONS: 5 available. G44, #2867RF, has 50 hours since overhaul. Metal propellers. Gyros. Omni. Lear-12 ADF. Bargain. $12,500.

LOCKHEED 10-A: Painted Executive #6517TF has 520 hours since rebuilt. Engines and constant speed propellers under 300 hours since major overhaul. 4 seats and couch. Lavatory. Buffets. Airline instruments and radio. Exceptional. $21,150.

LUSCOMBE 8F'S 90 HP.: 6 available. #227QBF has only 136 hours. Metal propeller. Radio. Excellent. $2100.

NAVIONS: 31 from $5500. 1947, #879RHF, has 650 hours. New 1950 205 HP., engine has 50 hours. Extra tank. Hartzell controllable propeller. Special heater. Primary blind. Radio. ADF. Extras. All bulletins. Excellent. $6500. Also; 1948, #444QKF, with new 205 HP., engine and Hartzell propeller. Extra tank. Late wheel fairings and long stacks. Gyros. Omni. Good "buy." $8000. Also; 1948, #449XKF, with seldom found desirable 225 HP., engine. Far better performance. 120 hours since complete overhaul. ADF. $7800.

NAVION SUPER 260'S: 6 available. March 1951, #531JKF, has 385 hours. Controllable metal propeller. Aux. tank. Bargain. $14,150.

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PIPER PACER 125'S & 135'S: 12 available. 1950 125 HP., #768JKF, has 347 hours. Metal propeller. Primary blind. Radio. $3500. Also; July 1952 135 HP., #221JAF, with 118 hours. Metal propeller. Gyro. Omni. Extras. $5600.

PIPER TRI-PACER 125'S & 135'S: 11 available. 1951 125 HP., #81TAF, has 82 hours. Metal propeller. Gyro. Radio. Loop. $4750. Also; 1952 135 HP., #197ZAF, with 150 hours. Metal propeller. Primary blind. Omni. Loop. Extras. $5500.

STINSON 1948-49 165'S: 15 from $2800. 1949, #407FCF, has 550 hours. Metal propeller. Primary blind. Omni. Best condition. $2970.

SWIFT 125'S: 22 available. 1946, #334GKF, has 390 hours. Aeromatic. Primary blind. Radio. Loop. Excellent. $2100. Also; painted 1949, #242QBF, with 278 hours. Aeromatic. Primary blind. Radio. Extras. Exceptional. $3350.

WACO ZPF-7 FLOAT PLANE: 285 HP., #1771SF, has 498 hours, 177 since completely overhauled. Metal propeller. Primary blind. ADF. Extras. Spare zero engine. Wheels and spares included. Beautiful. Exceptional offering. $3250.

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BIRD'S EYE VIEW

Passengers aboard American Airlines Flight 30, last April 22, had front row seats for the atomic explosion at Yucca Flats, Nevada. Nineteen thousand feet up, and a safe 70 miles from the actual blast, they saw the blinding flash, then watched the atomic cloud mushroom. Norman E. Danielson of Los Angeles was a passenger on the flight and, with his color camera, took the two pictures reproduced here. Look under wing tip for the flash and expanding cloud.

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MAIL BOX

(Continued from page 6)

COST ACCOUNTING

I was interested in two Mail Box letters last month—one bemoaning the high cost of private aviation, the other saying how cheap it could be.

To see how my expenses stacked up, I got out my check stubs for the last three years and came out with the following total: $5,683. Sounds like a lot, doesn't it? BUT . . . it includes:

Forty-five hours rental of a J-3 and 15 hours dual to get my private license;

Purchase of a 1946 Cessna 140 for $2,000;

Purchase and installation of a new surplus Bendix MN-26 Radio Compass for $300 and a 2-way Lear VHF set for $400;

Numerous 25-hour checks, three relicenses on my Cessna and one engine major, all done by professional mechanics at no discount;

One complete paint job inside and out, plus seat covers and sponge supporting in the seats;

Purchase and installation of blind flying instruments, retractable landing light, blind flying hood and goggles, infra-red night light, new set of tires ($60), one wooden prop ($85) and one metal ($120 after trade-in);

Hangar rent never under $15 per month and usually $20;

Seventy-two hours of dual @ $4 per hour and the instructor alone to obtain my instrument rate and another 15 hours for my commercial;

Trips which have taken me to all but eight States of the Union;

The expense of becoming proficient in numerous types of single engine lightplanes, all at operators' prices;

Above all, every penny I paid for my 530:50 hours of logged flying time.

This gives me an over-all expense of $10.50 per hour, or something under 10c per mile. My 1951 Ford cost me well over that.

Bear in mind that, as private pilots go, I have done the most expensive kind of flying—all maintenance has been professional; over one-fifth of my flying time has been dual; I have always hangared my plane at an airport and I have not only "fancied up" my plane but have added to it expensive equipment which requires considerable maintenance.

I hope this will be a word of encouragement to readers who are debating whether or not to enter into the great world of lightplane flying.

FRANCIS D. SHELDEN

Detroit, Michigan

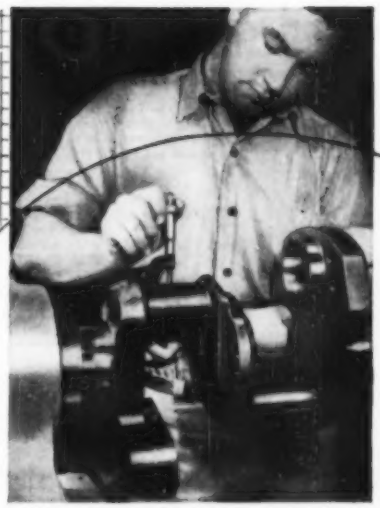
ROYAL READER

I read your "Royal Pilot" (FLYING, August) a couple of days ago and enjoyed it. It happened to be my great pleasure to meet Prince Bernhard (who is a regular guy) this morning. He hadn't read the article so I have given him a copy and am enclosing a request for a year's subscription to FLYING for him.

CMDR. CHARLES OATES, USN

c/o FPO, New York

(Continued on page 134)



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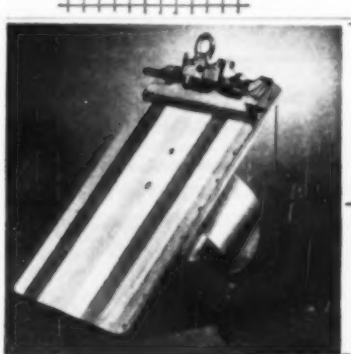

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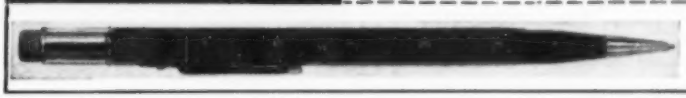

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(Continued from page 133)

RUSSIAN FOOTNOTES

The article "Russia's Air Youth Program" (FLYING, September), is very interesting. Just one or two points need mention.

DOSAV has for some time been recombined with DOSFLOT and DOSARM and the joint organization is currently known as DOSAAF.

Gribovskii is not the only one of these designers whose work is known from previous times. V. Nikitin produced a couple of speedy sportplanes—the NV-1 and NV-2—in the mid 1930's. However, Golayev, Elibekyan and Ollo and Shprangiel would appear to be newcomers.

Finally, Gribovskii's first names are Vladislav Konstantinovich.

DENYS J. VOADEN
Oxford University, London, England.

LUMBER-LIFT

I see possibilities in flying that rival crop dusting work—in portable sawmills flown in and lumber flown out after it is dry, eliminating long and expensive access roads. In fact I have 40 acres with 100,000 feet of lumber only eight miles south of Spokane that I wish someone would consider. Even starting a practical flying logging school on my place would be enthusiastically welcomed.

GILBERT STRAND
Spangle, Washington

SOARING

In the past few issues of FLYING I have enjoyed the articles on soaring. I believe you would be doing the G.I. vet pilot who wants to fly but finds he is financially unable a great service if you would inform him of the actual cost of flying gliders and the thrill of soaring.

I made a trip to Texas in August towing a TG-2 on a trailer behind our Chev. My wife, nine-year-old son and I lived in motels for two weeks, driving approximately 4,500 miles. I made five flights totaling about 25 hours and my wife and son served as crew and retrieved me, which made a perfect vacation for the whole family. We left home with $250 and of course we just made it back, but the entire cost of the vacation was only $10 per flying hour.

I think thousands of let-down G.I. pilots would be interested in this kind of flying.

RAY JACKSON
Dearborn, Michigan

Gracy Jackson and Ray, Jr.

THEY STILL NEED BLOOD

The need for life-giving blood never lets up in Korea. Here Lt. Jean E. Thompson, Air Force flight nurse, is shown with a case of whole blood, transported to Korea via Military Air Transport Service (MATS).

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Latest figures show a total of 129,197 volunteers participating in Operation Skywatch in the 27-state area included in that program, with 22,704 volunteers in the stand-by areas bringing the total membership in the Ground Observer Corps to 151,901. Defense officials estimate that at least half a million volunteers are needed to guarantee the effectiveness of the nation's defense network. Present enlistment is tabulated as follows:

Unit	Total Observation Posts In Skywatch	Active Observation Post Volunteers	Active Filter Center Volunteers	Total Active Volunteers
New Haven, Conn.	98	4550	114	4664
White Plains, N. Y.	105	5748	233	5981
Trenton, N. J.	40	2877	115	2992
Harrisburg, Pa.	80	6300	224	6524
Pittsburgh, Pa.	61	2400	217	2617
Baltimore, Md.	118	5348	256	5604
Richmond, Va.	46	1610	300	1910
Roanoke, Va.*	—	816	561	1377
Springfield, Ill.*	—	450	255	705
Chicago, Ill.	89	3650	185	3835
South Bend, Ind.	109	6150	109	6259
Grand Rapids, Mich.	111	2886	153	3039
Columbus, Ohio	141	3525	153	3678
Canton, Ohio	66	4390	162	4552
Louisville, Ky.*	—	2003	397	2400
Lexington, Ky.*	—	2460	268	2728
Bismarck, N. D.	25	1700	63	1763
Fargo, N. D.	30	1037	83	1120
Rapid City, S. D.	48	1594	217	1811
Sioux Falls, S. D.	32	300	20	320
North Platte, Nebr.*	—	485	176	661
Omaha, Nebr.*	—	1455	210	1665
Minneapolis, Minn.	136	6460	127	6587
Des Moines, Iowa*	—	1571	108	1679
Green Bay, Wis.	303	4356	20	4376
Buffalo, N. Y.	81	5971	275	6246
Syracuse, N. Y.	236	6410	179	6589
Albany, N. Y.	118	5900	87	5987
Manchester, N. H.	284	5581	121	5702
Bangor, Maine	83	3745	176	3921
Nashville, Tenn.*	—	1225	105	1330
Knoxville, Tenn.*	—	828	255	1083
Durham, N. C.*	—	353	63	416
Charlotte, S. C.*	—	96	210	306
Savannah, Ga.*	—	812	214	1026
Atlanta, Ga.*	—	320	515	835
Jacksonville, Fla.*	—	920	210	1130
Miami, Fla.*	—	574	677	1251
Seattle, Wash.	84	2149	212	2361
Spokane, Wash.	76	5462	556	6018
Portland, Ore.	102	4744	167	4911
Santa Ana, Calif.	81	2267	223	2490
Pasadena, Calif.	121	3859	695	4554
Oakland, Calif.	91	4312	307	4619
Sacramento, Calif.	56	4356	641	4997
Helena, Mont.	122	652	59	711
Billings, Mont.	64	2210	249	2459
Boise, Idaho*	—	1535	442	1977
Casper, Wyo.*	—	1592	543	2135
Skywatch Totals	3237	122,499	6698	129,197
Stand-By Area Totals*	——	17,495	5209	22,704
Air Defense Command Totals	3237	139,994	11,907	151,901

* Denotes Stand-by area

PAUSE THAT REFRESHES . . . Free coffee and sandwiches were provided for filter center workers in Pasadena, Calif., when a local newspaper raised $440 for that purpose.

NEVER TOO OLD . . . Olaf Eng, 80, believed to be the oldest observer in the U.S., goes on duty regularly each week at the post one mile north of Larimore, N. D.

SOUND MEASURES . . . In an attempt to eliminate faulty acoustics at the Boise, Idaho, filter center, walls were curtained with beige, fireproof monks' cloth.

NAMES MAKE NEWS . . . As a public service, the Kindred, N. D., Tribune prints a weekly list of names and times for volunteers to report for post duty.

SMALL BUT DEPENDABLE . . . Halsey Valley, N. Y., with a population of less than 100, has maintained its post in almost continuous operation since last July 14.

LADY WITH A LAMP . . . The first signature on the "sign in" sheet at the Minneapolis filter center when Operation Skywatch began was that of Mrs. Florence Nightengale.

ON THE AIR . . . One of the best posts in the Copper County area of Michigan is at Hancock, where a new tower has been completed. In addition to a telephone, the tower has a two-way radio for emergency use.

TRACTOR TRAVEL . . . Six volunteers, all farmers, man the Pottersburg, Ohio, post 24 hours a day. They drive a tractor to the house to place a flash call, with a resulting time lag of only two and one-half minutes.

LOUNGE IN LUXURY . . . Seattle filter center workers relax between tours of duty in a coffee lounge donated to the center by the Boeing Aircraft Co. Boeing spent $4,000 to construct and furnish the room, which includes easy chairs, a coffee bar, refrigerator and coke machine.

(Advertisement)

GROUND OBSERVER CORPS NEEDS 300,000 VOLUNTEERS

Early this summer top U.S. Air Force officials met with Civil Defense directors from 16 states and four territories, and reviewed in confidential detail the current efforts to defend America from surprise enemy attack.

"Despite a $300,000,000 radar fence around the nation's perimeter, gaps exist through which enemy aircraft could penetrate our defenses undetected," the meeting was told.

That's why America needs a total of 500,000 civilian skywatchers as members of the Ground Observer Corps. Nearly 200,000 have already volunteered.

"The only practical means of filling the gaps in our defenses is through a 24-hour operation by civilian volunteers," the meeting was told.

Why isn't America's radar network sufficient?

Defense gaps exists because of radar's line of sight principle, and radar's failure to penetrate opaque masses. Every mountain, every hill casts a shadow behind which enemy aircraft could sneak undetected. Even in perfectly flat country the curvature of the earth shortens the effective range. Equally alarming, radar is susceptible to jamming.

These gaps cannot be filled by Air Force personnel due to the staggering expense. That's why civilians are needed in 27 perimeter states to man Ground Observer Corps stations 24 hours a day. Here is a critical, patriotic job that requires just a few hours a week from each volunteer.

Aircraft too are an important part of our national warning system and of course are the backbone of defense against attack. Three advanced Lockheed planes play a vital role:

The WV-2 *Super Constellation* Early Warning Aircraft, developed for the Navy and the Air Force to extend radar's range in a whole new concept of national defense.

The P2V *Neptune* Navy Patrol Bomber, charged by the Navy with anti-submarine patrol and protection of U. S. coastal waters.

And the F-94C *Starfire*, the nearly automatic all-weather interceptor, which does the final job of climbing to the attack at terrific speed, locating the invaders, and shooting them down with more than human accuracy.

When the U. S. has all necessary planes and personnel—civilian and military—it will be difficult for enemy aircraft to penetrate U.S. defenses.

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AIR DEFENSE FROM THE GROUND UP

AIR ATTACK! This alarm could be sounded in the U.S. If it is, then time will be priceless.

The U.S. Air Force is ready to answer any alarm—with squadrons of Lockheed Starfire interceptors* that can climb quickly to the attack, locate and knock out invading bombers in any weather, day or night.

But first the alarm must be given. Somebody must spot the invaders.

And there are only two ways to spot an air attack: (1) by radar (2) with human eyes and ears. Ground radar stations cannot always spot planes flying under 5,000 feet. So we badly need civilian observers.

True, airplanes are being built to take our radar warning system off the ground. For this job Lockheed is producing WV-2 Early Warning Constellations with 360-degree radar.

Also the Navy has many Lockheed P2V Neptunes on antisubmarine patrol day and night. Their "eyes" guard against air attack too.

But we still need an additional 300,000 men and women observers to fill the low-level radar gaps. You give just a few hours a week. Call your Civilian Defense Office, or write to Ground Observers Corps, U.S. Air Force, Washington 25, D.C.

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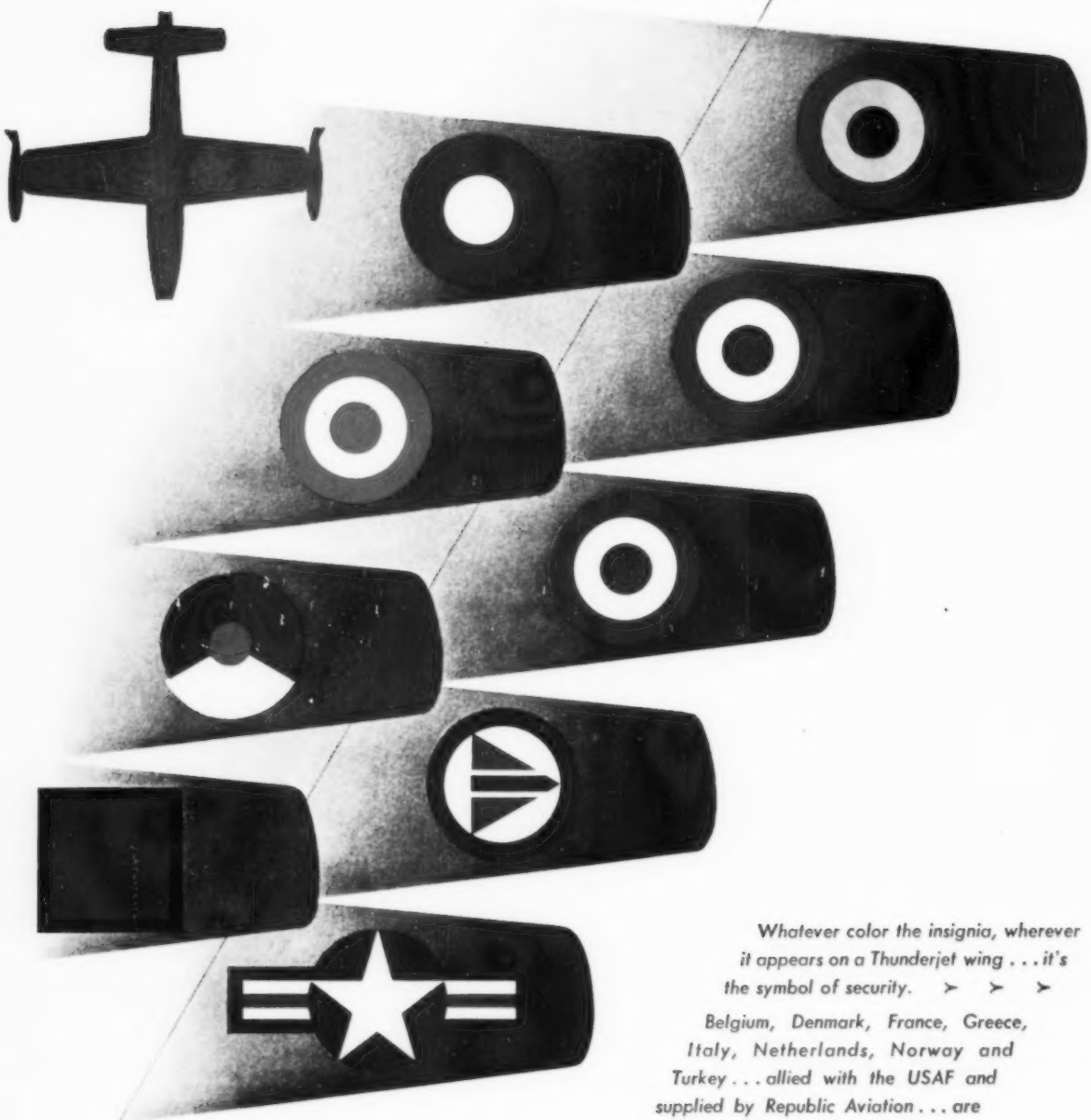

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